FORM 5. Petition for Review/Notice of Appeal of an Order or Decision of an Agency, Board, Commission, Office, Bureau, or the US Court of Federal Claims (vaccine appeals only)) **Form 5 March 2023**

UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

PETITION FOR REVIEW/NOTICE OF APPEAL

Notice is hereby given that the petitioner(s)/appellant(s) listed below hereby appeal(s) the below-noted case to the United States Court of Appeals for the Federal Circuit.

Originating Tribunal *(Name of Agency, Board, Commission, Office, Bureau, or Court whose decision is being appealed)*: USPTO Patent Trial and Appeal Board

Case number being appealed: IPR2021-00986

Case title being appealed: Snap Inc. v. Xerox Corporation

Date of final decision or order being appealed: 03/22/2023

Date decision or order was received: 03/22/2023

☒ I have attached a copy of the decision or order being appealed.

List all Petitioners/Appellants (List each party filing this appeal. Do not use "et al." or other abbreviations. Attach continuation pages if necessary.)

Xerox Corporation

Date: 05/23/2023

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UNITED STATES PATENT AND TRADEMARK OFFICE

_____

BEFORE THE PATENT TRIAL AND APPEAL BOARD

_____

SNAP INC.,
Petitioner

v.

XEROX CORPORATION,
Patent Owner

Case: IPR2021-00986
U.S. Patent No. 9,208,439 B2

_____

PATENT OWNER'S NOTICE OF APPEAL

Mail Stop "PATENT BOARD"
Patent Trial and Appeal Board
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313

Pursuant to 35 U.S.C. §§ 141-142 and 319, 37 C.F.R. §§ 90.2-90.3, Federal Rule of Appellate Procedure 15, and Federal Circuit Rule 15, Patent Owner Xerox Corporation ("Xerox") hereby provides notice that it appeals to the United States Court of Appeals for the Federal Circuit from the Final Written Decision of the Patent Trial and Appeal Board (the "Board") entered on March 22, 2023 (Paper 54, "Final Written Decision"), and from all underlying findings, determinations, rulings, opinions, orders, issues, and decisions regarding the *inter partes* review of United States Patent No. 9,208,439 B2 (the "'439 Patent"). This Notice of Appeal and petition for review of the Final Written Decision is timely under 37 C.F.R. § 90.3(a)(1), having been filed within 63 days of the Final Written Decision.

For the limited purpose of providing the Director with the information requested in 37 C.F.R. § 90.2(a)(3)(ii), issues on appeal may include but are not limited to the Board's factual findings and conclusions of law, the Board's determinations of the unpatentability of claims and any finding or determination supporting or relating to such determinations of unpatentability including but not limited to claim construction issues, obviousness issues, the scope of the alleged prior art, Board findings that conflict with the evidence of record and are not supported by substantial evidence, as well as all other issues decided adversely to Patent Owner in any orders, decisions, rulings and/or opinions, further including but not limited to: (i) the Board's interpretation of the alleged prior art; (ii) the

Board's claim constructions; (iii) the Board's determination that claims 1-20 of the '439 Patent were shown to be obvious under 35 U.S.C. § 103(a) and are thus unpatentable; (iv) the Board's determination that contingent substitute claims 21-40 were shown to be obvious under 35 U.S.C. § 103(a) and are thus unpatentable; (v) the Board's determination that PARC did not show that contingent substitute claims 21-40 did not contain new matter; (vi) the Board's legal errors in undertaking its obviousness analyses; (vii) the Board's motivation to combine analyses; (viii) the Board's analysis of secondary considerations of nonobviousness; (ix) the Board's legal errors in undertaking its new matter analysis; (x) the Board's findings that conflict with the evidence of record or are otherwise unsupported by substantial evidence; (xi) the Board's failure to consider evidence of record (including testimonial and documentary) fully and properly; and (xii) any other findings or determinations supporting or relating to these issues as well as all other issues decided adversely to Patent Owner in any orders, decisions, rulings, or opinions in this proceeding.

Simultaneously with this submission, Patent Owner is filing a true and correct copy of this Notice of Appeal with the Director of the United States Patent and Trademark Office as well as a true and correct copy of the same, along with the required filing fee, with the Clerk of the United States Court of Appeals for the Federal Circuit as set forth in the accompanying Certificate of Filing.

Dated: May 23, 2023

Respectfully submitted,

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CERTIFICATE OF FILING

The undersigned hereby certifies that, in addition to being electronically filed, a true and correct copy of the above-captioned PATENT OWNER'S NOTICE OF APPEAL is being filed via Priority Mail Express with the Director on May 23, 2023, at the following address:

Director of the United States Patent and Trademark Office
c/o Office of the General Counsel, 10B20
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, Virginia 22313-1450

The undersigned also hereby certifies that a true and correct copy of the above-captioned PATENT OWNER'S NOTICE OF APPEAL and the filing fee is being filed via CM/ECF with the Clerk's Office of the United States Court of Appeals for the Federal Circuit on May 23, 2023.

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that the foregoing PATENT OWNER'S NOTICE OF APPEAL was served via electronic mail on May 23, 2023, in its entirety on the following:

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Paper 54
Date: March 22, 2023

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SNAP INC.,
Petitioner,

v.

PALO ALTO RESEARCH CENTER LLC,
Patent Owner.

IPR2021-00986
Patent 9,208,439 B2

Before KARL D. EASTHOM, SHEILA F. McSHANE, and CHRISTOPHER L. OGDEN, *Administrative Patent Judges*.

OGDEN, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
Denying Patent Owner's Motion to Amend
Denying Patent Owner's Motion to Exclude
35 U.S.C. § 318(a)

I. INTRODUCTION

In response to a Petition (Paper 1, "Pet.") filed by Petitioner Snap Inc. ("Snap"), the Board instituted an *inter partes* review of claims 1–20 of U.S. Patent No. 9,208,439 B2 (Ex. 1001, "the '439 patent"). Paper 11, ("Dec."). Patent Owner Palo Alto Research Center Inc. (now Palo Alto Research Center LLC) ("PARC") filed a Patent Owner Response (Paper 19, "PO Resp."), Snap filed a Reply to the Patent Owner Response (Paper 23, "Pet. Reply"), and PARC filed a Sur-reply (Paper 30, "PO Sur-reply").

PARC also filed a Contingent Motion to Amend proposing substitute claims 21–40 if we find the original claims unpatentable. Paper 20 ("MTA"). Snap filed an Opposition to this Motion to Amend (Paper 22, "Pet. Opp. MTA"). After we issued Preliminary Guidance on the Motion to Amend under the Board's Motion to Amend Pilot Program (Paper 28), PARC filed a Reply (Paper 29, "PO Reply MTA") and Snap filed a Sur-reply. Paper 37 ("Pet. Sur-reply MTA").

We held an oral hearing on August 24, 2022, and the transcript is in the record. Paper 44 ("Tr.").

This is a final written decision under 35 U.S.C. § 318(a) as to whether the claims challenged in the *inter partes* review are unpatentable.[1] For the reasons below, we conclude that Snap has shown that all the challenged claims are unpatentable on at least one ground of the Petition. Snap has also shown, by a preponderance of the evidence, that all pending proposed

[1] On November 7, 2022, the Chief Administrative Patent Judge issued a good-cause extension to the one-year period for issuing this decision. *See* Paper 46; *see also* Paper 47.

substitute claims are unpatentable and PARC has failed to show that they do not contain new matter, so we also deny PARC's Motion to Amend.

II. BACKGROUND

A. RELATED PROCEEDINGS

Both parties are involved in the following related U.S. district court case: *Palo Alto Research Center Inc. v. Snap Inc.*, No. 2:20-cv-10755-AB (C.D. Cal. filed Nov. 25, 2020). Pet. 1; Paper 5, 2. The parties also identify the following two related matters: *Palo Alto Research Center Inc. v. Twitter, Inc.*, No. 2:20-cv-10754-AB (C.D. Cal. filed Nov. 25, 2020); *Palo Alto Research Center Inc. v. Facebook, Inc.*, No. 2:20-cv-10753-AB (C.D. Cal. filed Nov. 25, 2020). Pet. 1; Paper 4, 2–3.

The '439 patent is also the subject of *inter partes* reviews IPR2021-01430 (instituted March 15, 2022) and IPR2021-01461 (instituted March 24, 2022).

B. THE '439 PATENT (EX. 1001)

The '439 patent issued on December 8, 2015 from an application filed on April 29, 2013. Ex. 1001, codes (22), (45). It relates to "a method and system for collecting mobile device contextual information and facilitating efficient adaptation of a generic contextual intelligence system for customized applications." Ex. 1001, 1:8–12. A context-aware system on a mobile device detects the computing environment, and the system may recommend activities, such as leisure activities, based on a user model. *Id*. at 1:22–23, 1:30–31.

Figure 6, reproduced below, is a flowchart illustrating the steps of processing an event. Ex. 1001, 2:23–25.

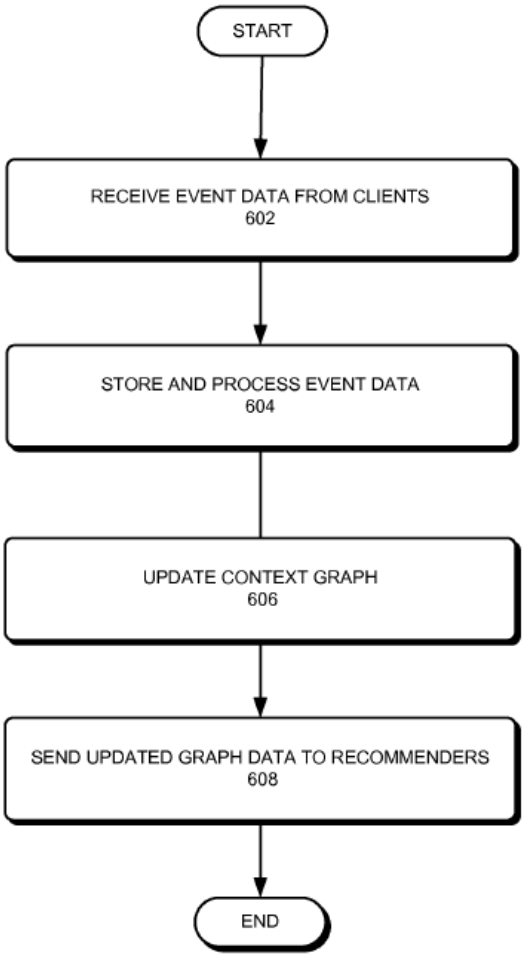

FIG. 6

In the steps shown in Figure 6 above, a server receives event data from clients (operation 602), and then stores and processes the event data (operation 604). *Id.* at 9:13–19. The server then analyzes the event data and uses it to update a "context graph" (operation 606). *Id*. at 9:19–24. Next, the server sends the context graph data, and changed graph data, to relevant "recommenders" (operation 608). *Id*. at 9:26–29.

According to the '439 patent, "[a] context graph is an in-memory model that stores facts and assertions about a user's behavior and interests." Ex. 1001, 3:20–22. "A recommender is an application that recommends items or activities for a user." *Id*. at 3:23–25.

Figure 4, reproduced below, is a block diagram relating events, a mapper, and a context graph. Ex. 1001, 6:59–61.

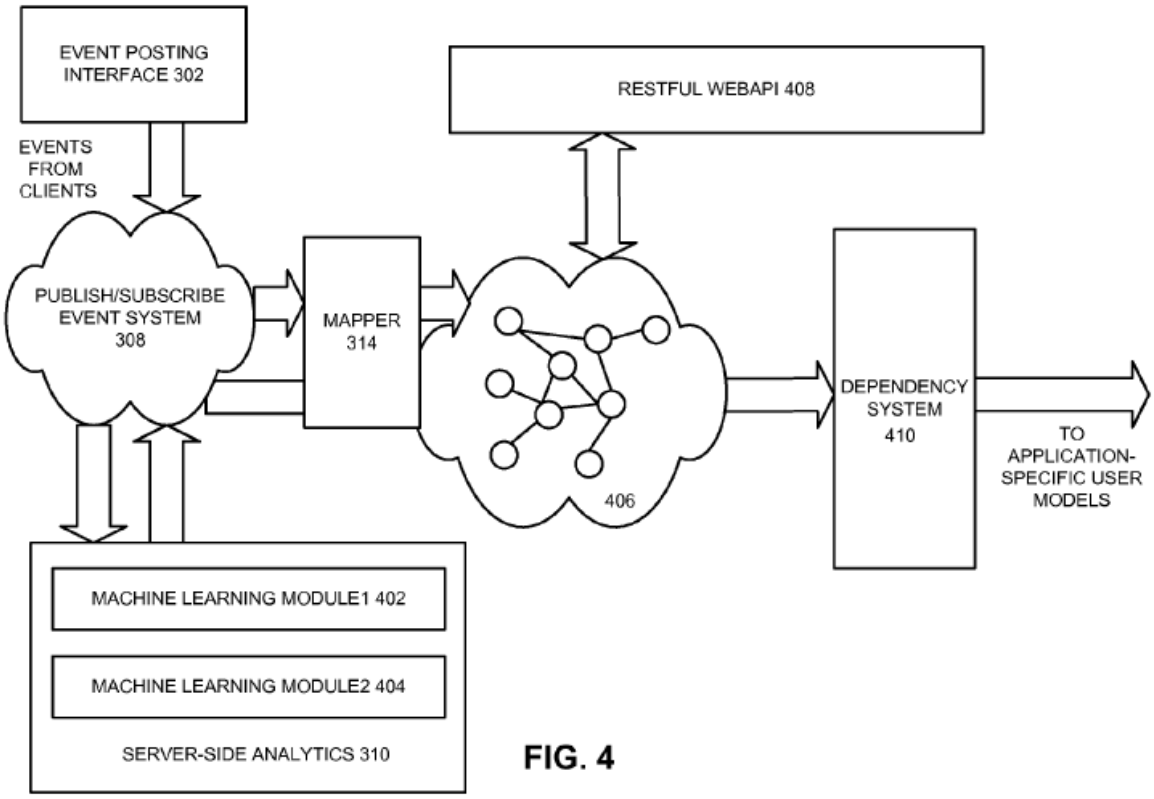

FIG. 4

As shown in Figure 4, event posting interface 302 sends events received from clients to publish/subscribe event system 308. *Id.* at 7:7–9. Based on subscriptions to publish/subscribe event system 308, mapper 314 uses the event data to modify context graph 406. *Id.* at 7:7–9, 7:44–47. "Context graph 406 functions as a storage component of a generalized user model. A user model describes predicted current and future activities and interests for a user." *Id.* at 7:34–36.

C. Challenged Claims and Grounds

Claims 1, 7, and 13 of the '439 patent are independent. Claim 1, representative of the challenged claims, reads as follows:

> 1. A method, comprising:
>
> [a] receiving, from a mobile device, event data derived from contextual data collected using detectors that detect a physical context surrounding the mobile device;
>
> [b] modifying a context graph that stores facts and assertions about a user's behavior and interests using the event data;
>
> [c] in response to determining that there exists a registration for notification of changes that matches the modification to the context graph, sending a notification of context graph change to a recommender.

Ex. 1001, 10:30–40 (Snap's reference letters added in brackets).

Snap argues five grounds for *inter partes* review, as summarized in the following table:

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1–4, 7–10, 13–16	103[2]	Nitz,[3] Nykänen[4]
6, 12, 18	103	Nitz, Nykänen, Mishra[5]
5, 11, 17	103	Nitz, Nykänen, Chang[6]
19	103	Nitz, Nykänen, Mccolgan[7]
20	103	Nitz, Nykänen, Sathish[8]

Pet. 3–4.

D. DECLARATORY TESTIMONY

Snap relies on a declaration by Steve Smoot (Ex. 1002) and a declaration by Dr. Kevin C. Almeroth (Ex. 1036).

PARC relies on two declarations by Dr. David Martin. Exs. 2004, 2011.

III. PARC'S MOTION TO EXCLUDE

PARC moves "to exclude the entirety of Exhibits 1028 and 1031, and the references to those exhibits contained in paragraphs 41, 125, and 126 of Exhibit 1036 (including the figures contained therein)." Paper 36, 1.

Exhibits 1028 and 1031 are annotated versions of material extracted from Figure 4 of the '439 patent. PARC objects to the exhibits under Rules

[2] 35 U.S.C. § 103 (2018).

[3] US 9,015,099 B2, filed August 14, 2012, issued April 21, 2015 (Ex. 1005).

[4] US 6,714,778 B2, filed May 15, 2001, issued March 30, 2004 (Ex. 1006).

[5] US 2012/0135751 A1, published May 31, 2012 (Ex. 1007).

[6] US 2012/0046966 A1, published February 23, 2012 (Ex. 1008).

[7] US 2012/0096114 A1, published April 19, 2012 (Ex. 1009).

[8] US 8,010,669 B2, filed October 15, 2008, issued August 30, 2011 (Ex. 1010).

403, 602, 702, 703, and 901 of the Federal Rules of Evidence, and under 37 C.F.R. § 42.61. Paper 36, 2–8. In particular, PARC argues that the exhibits are not supported by an affidavit as required by 37 C.F.R. § 42.61; that the exhibits were created by Snap's attorneys during the deposition of Dr. Martin, and not by Snap's expert; that they are not based on personal knowledge; that their probative value does not substantially outweigh their prejudice; and that the exhibits constitute improper expert testimony. Paper 36, 2–8.

PARC argues that paragraphs 41, 125, and 126 of Exhibit 1036 refer to Exhibits 1028 and 1031, and in particular, paragraph 125 includes an excerpt of Exhibit 1031. Paper 36, 8. Thus, PARC objects to these paragraphs for the same reasons as the exhibits.[9]

For the same reasons, PARC also objects to certain demonstratives that Snap submitted for the oral hearing. *See* Paper 43 (objecting to at least portions of Exhibit 1050, slides 33, 73, and 102). PARC contends that "these slides include material that is subject to PARC's pending Motion to Exclude (Paper 36)."

Snap submitted an Opposition to the Motion to Exclude. Paper 39. Snap argues that PARC did not timely object to the use of Exhibit 1028 during Dr. Martin's deposition; that Exhibits 1028 and 1031 were

[9] In addition to the specified paragraphs, PARC "objects to any and all testimony regarding, and reliance on, the annotations of Figure 4 of the '439 Patent included in Exhibits 1028 and 1031." Paper 43, 8. Snap argues that this objection is insufficiently specific (Paper 39, 1–2) and we agree. We treat the Motion to Exclude to apply only to paragraphs 41, 125, and 126 (including the figure associated with paragraph 125), which are the only portions of Exhibit 1036 that PARC specifically identifies.

authenticated during Dr. Martin's deposition by his first-hand knowledge; that they are relevant for context; that their probative value outweighs any prejudicial effect; and that they are not improper expert testimony because Dr. Martin discussed them as an expert for PARC. Paper 39, 1, 3–13. Snap also argues that Exhibit 1036's references to Exhibits 1028 and 1031 are part of the facts and evidence that Dr. Almeroth used to form his own opinions, and the probative value of his opinions outweigh any prejudice. *Id.* at 13–15.

PARC also submitted a Reply in Support of its Motion to Exclude. Paper 40.

Because we do not rely on Exhibits 1028 or 1031, the challenged portions of Exhibit 1036, or on Snap's demonstratives in reaching our decision, we need not determine whether there is good cause to exclude the challenged material. Therefore, the Motion to Exclude is *dismissed* as moot.

IV. GROUNDS OF THE PETITION

For the reasons below, we determine that Snap has shown, by a preponderance of the evidence, that claims 1–20 of the '439 patent are unpatentable under the grounds of the Petition. Before analyzing these grounds in detail, we address two matters that underlie our analysis: the level of ordinary skill in the art and the construction we will apply to the claim terms.

A. Level of Ordinary Skill in the Art

The level of ordinary skill in the pertinent art at the time of the invention is a factor in how we construe patent claims. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (en banc). It is also one of

the factors we consider when determining whether a patent claim is obvious over the prior art. *See Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

To assess the level of ordinary skill, we construct a hypothetical "person of ordinary skill in the art," from whose vantage point we assess obviousness and claim interpretation. *See In re Rouffet*, 149 F.3d 1350, 1357 (Fed. Cir. 1998). This legal construct "presumes that all prior art references in the field of the invention are available to this hypothetical skilled artisan." *Id.* (citing *In re Carlson*, 983 F.2d 1032, 1038 (Fed. Cir. 1993)).

Relying on the testimony of Mr. Smoot, Snap proposes that a person of ordinary skill in the art at the time of the '439 patent would have had "an undergraduate degree in electrical engineering, computer engineering, computer science or a related field along with at least two years of work experience in the field of remote data collection and context-based systems/processes." Pet. 5 (citing Ex. 1002 ¶¶ 17–19). Snap further asserts that additional "practical experience can supplement education and vice versa." *Id*.

For this proceeding, PARC does not dispute this proposed level of ordinary skill. PO Resp. 9. Because Snap's uncontroverted articulation of the level of ordinary skill in the art is supported by testimonial evidence and appears consistent with the types of problems and solutions in the '439 patent, we adopt it for this decision. *See, e.g.*, Ex. 1001, 1:4–33 ("Background" section of the '439 patent, describing the field and related art as relating to the use of contextual data in computer systems).

B. CLAIM CONSTRUCTION

In an *inter partes* review, we construe a patent claim "using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. 282(b)." 37 C.F.R. § 42.100(b) (2021). This generally includes "construing the claim in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent." *Id.* The ordinary and customary meaning of a claim term "is its meaning to the ordinary artisan after reading the entire patent," and "as of the effective filing date of the patent application." *Phillips*, 415 F.3d at 1313, 1321. There are only two circumstances in which a construction departs from the ordinary and customary meaning: "1) when a patentee sets out a definition and acts as [their] own lexicographer, or 2) when the patentee disavows the full scope of a claim term either in the specification or during prosecution." *Thorner v. Sony Comput. Entm't Am. LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012). Any such special meaning of a term "must be sufficiently clear in the specification that any departure from common usage would be so understood by a person of experience in the field of the invention." *Multiform Desiccants Inc. v. Medzam Ltd.*, 133 F.3d 1473, 1477 (Fed. Cir. 1998).

To construe the claim terms, "we look principally to the intrinsic evidence of record, examining the claim language itself, the written description, and the prosecution history, if in evidence." *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 469 F.3d 1005, 1014 (Fed. Cir. 2006).

Snap did not initially identify any claim terms needing an explicit construction, but later in its Petition, argued that the '439 patent defines a "context graph" as "an in-memory model that stores facts and assertions

about a user's behavior and interests." Pet. 7, 15 (quoting Ex. 1001, 3:20–22).

PARC argues that Snap's proposed construction means that "the 'context graph' need not be a graph." PO Resp. 11. Instead, PARC proposes that we should construe the term to mean a "per-user, in-memory, graph-based model." *Id.* (emphasis omitted). According to PARC, "the claim language itself explicitly states that the facts and assertions are stored in a graph." *Id.* (citing Ex. 1001, 10:34–35, 11:7–8, 12:1–2). PARC also points to dependent claim 20, which refers to "topological changes in the context graph" and to "properties of nodes and edges in the context graph." *Id.* at 11–12 (emphasis omitted) (quoting Ex. 1001, 12:53–55).

PARC also points to supporting disclosures in the '439 patent specification, including Figure 4 which, according to PARC, describe context graph 406 as having nodes and edges that, through their topology, store facts and assertions about user behavior and actions. PO Resp. 12–13 (citing Ex. 1001, 2:17–19, 7:26–28, 7:58–60, Fig. 4; Ex. 2004 ¶ 42). PARC acknowledges that the '439 patent discloses a number of ways to store the context graph in memory, for example using a "type-less approach to data storage" or storing the data as "entity-relationship data and unstructured data." *Id.* at 13 (quoting Ex. 1001, 7:36–40) (citing Ex. 2016 ¶¶ 87–89). But no matter the underlying representation, PARC contends that the data is ultimately stored as a graph-based model. *Id.* at 13–14 (citing Ex. 2006 (deposition of Mr. Smoot), 63:6–13, 64:3–12; Ex. 2004 ¶¶ 87–89). PARC also contends that, during prosecution of the '439 patent, the applicant "distinguished the prior art on the basis of the context graph's nodes." *Id.* at 14 (citing Ex. 1002, 107–08).

In its Reply, Snap argues that the '439 patent "expressly contemplates broader implementations" than just those that include "graph-based characteristics with node/edges." Pet. Reply 1. Snap contends that the '439 patent presents its proposed construction as definitional and not limited to any one particular embodiment, and only discusses nodes and edges twice in relation to the patent's main embodiment. *Id.* at 2 (citing Ex. 1001, code (57), 1:41–43, 2:48–52, 2:56–57, 3:18–22, 7:41–43, 7:59–60, Fig. 4; Ex. 1029, 52:2–53:5; Ex. 1036 ¶¶ 45–46, 48–49). Snap argues that the '439 patent contemplates other types of models than ones including nodes and edges, such as "entity-relationship data" as would appear in a relational database. *Id.* at 3–5 & n.2 (citing Ex. 1001, 2:16–19, 7:24–40, Fig. 4; Ex. 1029, 31:14–34:12, 40:18–41:16, 47:3–15; Ex. 1030, 4–41, 76–91; Ex. 1035 ¶¶ 28, 30, 149; Ex. 1036 ¶¶ 48–50).[10]

Snap also argues that the reference in dependent claim 20 to "topological changes" and "nodes and edges" introduce limitations to the structure of a context graph that do not appear in parent claim 1. Pet. Reply 5 (citing *Interdigital Commc'ns, LLC v. Int'l Trade Comm'n*, 690 F.3d 1318, 1324–25 (Fed. Cir. 2012)). Snap also disagrees with PARC's interpretation of the prosecution history: according to Snap, "[t]he statement highlighted by [PARC] was an attempt to differentiate prior art based on what is contained in the asserted context graph rather than what qualifies as a context graph." *Id.* at 6 (citing Ex. 1004, 107–108).

[10] Snap characterizes testimony of PARC's expert Dr. Martin as supporting its position that a context graph could be in the form of a relational database (Pet. Reply 4), to which PARC responds in its Sur-reply (PO Sur-reply 5–7). Because our decision does not rely on Dr. Martin's cited testimony on this point, we do not address the dispute as to how to interpret that testimony.

In its Sur-reply, PARC argues that Snap improperly reads out the word *graph* in its analysis of the term "context graph." PO Sur-reply 2–3 (citing *ACTV, Inc. v. Walt Disney Co.*, 346 F.3d 1082, 1088 (Fed. Cir. 2003); *Phillips*, 415 F.3d at 1327; *Aspex Eyewear, Inc. v. Marchon Eyewear, Inc.*, 672 F.3d 1335, 1348 (Fed. Cir. 2012); *Exmark Mfg. Co. Inc. v. Briggs & Stratton Corp.*, 830 F. App'x 305, 310 (Fed. Cir. 2020); *Bicon, Inc. v. Straumann Co.*, 441 F.3d 945, 950 (Fed. Cir. 2006)). PARC also contends that Snap's proposed construction is not definitional within the '439 patent, and the broader disclosure indicates that a context graph must be a graph-based model. *See id.* at 3–5 (citing Ex. 1001, 7:26–27, 7:41–43, 7:56–60; *InterDigital Commc'ns, Inc. v. Int'l Trade Comm'n*, 601 F. App'x 972, 978 (Fed. Cir. 2015); *Toro Co. v. White Consol. Indus.*, 199 F.3d 1295, 1299 (Fed. Cir. 1999); *Netcraft Corp. v. eBay, Inc.*, 549 F.3d 1394, 1398 (Fed. Cir. 2008); *Rambus Inc. v. Infineon Techs. AG*, 318 F.3d 1081, 1094–95 (Fed. Cir. 2003)).

We agree with Snap that its proposed construction of "context graph" as "an in-memory model that stores facts and assertions about a user's behavior and interests" appears explicitly in the '439 patent and appears to be definitional. *See* Ex. 1001, 3:20–22.[11] However, that definition is not helpful in construing the challenged claims for this case because it essentially tracks the claim language. We do agree that a context graph is at

[11] The statement in the '439 patent that "[c]ontext graph 406 is a per-user, in-memory, graph-based model," which is narrower than this definitional statement, is descriptive of context graph 406, which is indeed a graph-based model. *See* Ex. 1001, Fig. 4. We do not interpret this passage as being definitional of the term "context graph."

least an "in-memory model," and both parties appear to agree on that point. *See* Pet. 15; PO Resp. 11.

We need not decide the question of whether a context graph must be "per-user" because, as we discuss below, the primary reference Nitz explicitly discloses storing information on a per-user basis. *See infra* Section IV.C.4; *see also* Ex. 1005, 14:46–51, 14:61–15:4, 15:11–24, 15:43–44, 15:56–16:4, 17:19–21, 18:19–23; *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) ("[W]e need only construe terms 'that are in controversy, and only to the extent necessary to resolve the controversy' . . . ." (quoting *Vivid Techs., Inc. v. Am. Sci & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

As to whether a context graph must be "graph-based," we find Snap's arguments persuasive that a person of ordinary skill in the art would not have understood the '439 patent to be limiting in the sense that it requires the graph to store information about a user in the form of nodes and edges. Although the term "context graph" implies a model that could be understood as a graph, the patent expresses an intention not to be limiting as to the particular way in which facts and assertions about a user are stored in the model. *See, e.g.*, Ex. 1001, 7:36–40 ("The system can store data in context graph 406 using a type-less approach to data storage. Context graph 406 may store data according to different data models, including data models for entity-relationship data and unstructured data.").

In particular, we agree with Snap that, based on the '439 patent's statement that a context graph may be stored as "entity-relationship data," a person of ordinary skill in the art would have understood the term "context-graph" to include data stored in the form of a relational database. *See* Pet.

Reply 4. The word "graph" in the term "context graph" is not superfluous if the model is stored in the form of a relational database because, as Snap persuasively argues, a person of ordinary skill in the art would have understood that data entries in such a database are, conceptually, "nodes," and the relationships between the table entries, such as pointers and keys, would conceptually be "edges." *See* Pet. Reply 4–5 n.2. But the '439 patent expresses an intention not to be limited to the particular form in which graph-like conceptual structures might be stored, and expressly endorses the storage of a context graph in the form of "entity-relationship data" such as would appear in a relational database. *See* Ex. 1001, 7:36–40.

We also agree with Snap that the prosecution leading to the '439 patent does not manifest an intent to limit the term "context graph" to a model stored in the form of nodes and edges. In the arguments made during prosecution, the applicant reiterated the definitional statement in the '439 patent disclosure that "a context graph is a 'model that stores facts and assertions about a user's behavior and interests.'" Ex. 1004, 108. The applicant distinguished the prior art reference because it "stores no facts or assertions about a user's behavior and interests," not because of the form in which the data was stored. *Id.*

Thus, we agree with Snap that, as used in the '439 patent, the term "context graph" does not necessarily need to be "graph-based" to the extent that its entries are stored in the form of nodes and edges. To the extent that other claim terms are significant, we discuss them below in the context of the asserted prior art.

C. INDEPENDENT CLAIMS 1, 7, AND 13

Turning to the grounds of the Petition, we begin with the challenge to claim 1, which asserts that claim 1 is unpatentable under 35 U.S.C. § 103 as obvious over Nitz in view of Nykänen. *See* Pet. 3, 8–28. For this challenge, Snap relies primarily on Nitz for the preamble and limitations 1[a]–[b] and relies on Nitz in view of Nykänen for limitation 1[c]. Pet. 8–28.

A claim is unpatentable under § 103 for obviousness "if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains." 35 U.S.C. § 103; *see also KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). When a ground in a petition is based on a combination of references, we consider "whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue." *Id.* at 418 (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

We base our obviousness inquiry on factual considerations including (1) the scope and content of the prior art, (2) any differences between the claimed subject matter and the prior art, (3) the level of skill in the art, and (4) any objective indicia of obviousness or non-obviousness that may be in evidence. *See Graham*, 383 U.S. at 17–18.

Considering these factors,[12] we determine that Snap has shown, by a preponderance of the evidence, that claim 1 is unpatentable under § 103 as

[12] Neither party presents evidence of objective indicia of obvious or non-obviousness, so no such evidence factors into our decision.

obvious over Nitz in view of Nykänen. We begin our analysis with a brief overview of Nitz and Nykänen, and then we address the parties' contentions with respect to the limitations of claim 1.

1. Overview of Nitz

> Nitz discloses a system that performs a method that includes
>
> monitoring one or more real-time sensor inputs at the mobile electronic device; applying an activity knowledge base to determine a current location-related situation from the one or more real time sensor inputs and stored user-specific information; and using automated reasoning, inferring a user-specific context relating to the current location-related situation from a plurality of possible contexts based on the one or more real-time sensor inputs and stored user-specific information.

Ex. 1005, 1:31–39. Figure 1, reproduced below, is a modular diagram of Nitz's system.

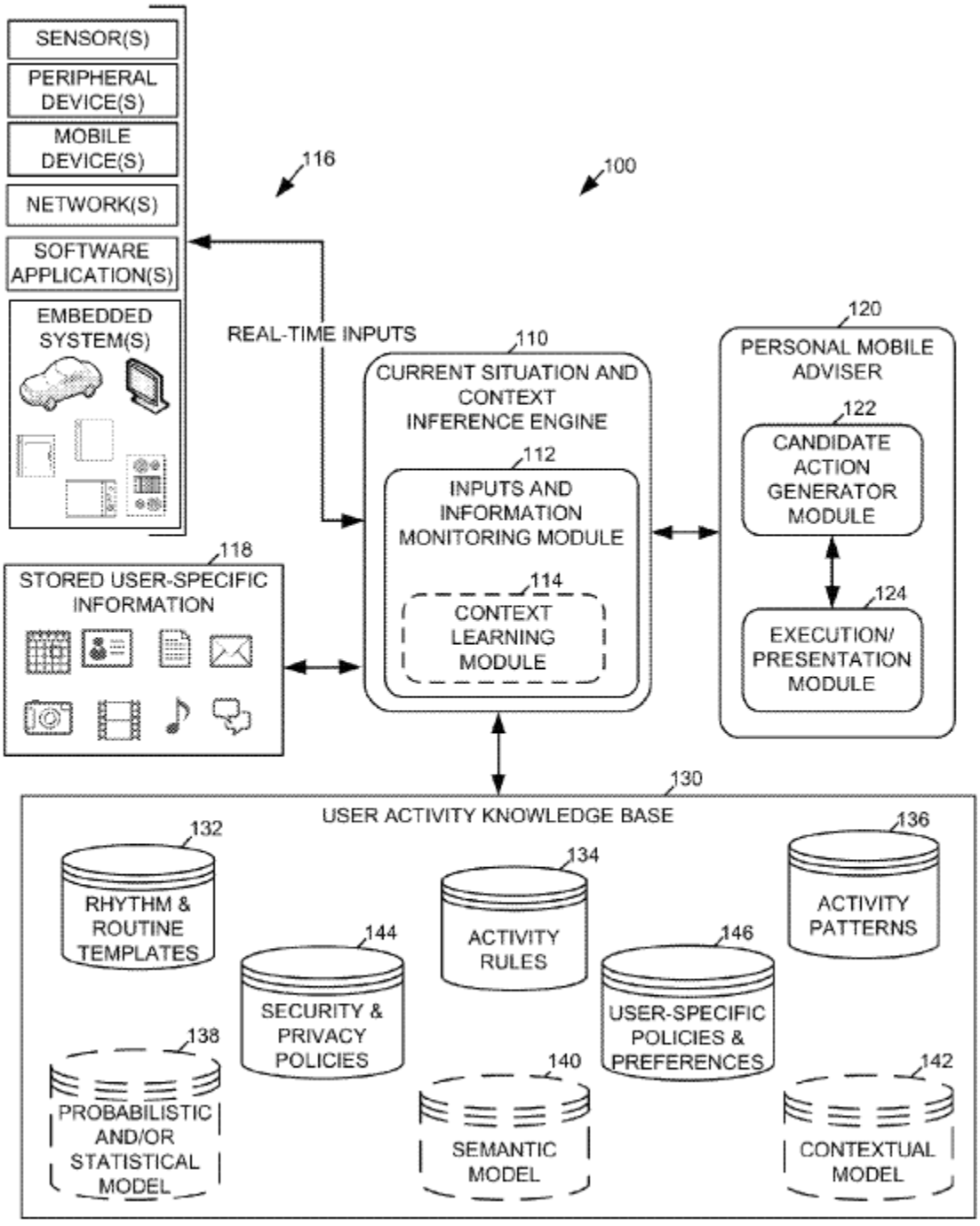

FIG. 1

Figure 1, above, shows Nitz's system, which can include a mobile device and inference engine 110 that applies aspects of a knowledge base 130 to real-time inputs 116 received at the mobile device and stored user-specific information 118 accessible to the mobile device. Ex. 1005, 4:53–65.

Personal mobile adviser 120 includes generator module 122 that generates candidate actions that may be helpful to the user in view of the user's current situation and context, as determined by the inference engine 110. *Id*. at 5:14–23. Candidate actions may include sending suggestions, such as alerts, notifications, recommended actions, and prompts for user input to the user or to other electronic devices. *Id*. at 5:23–28.

2. Overview of Nykänen

Nykänen is directed to a method to "enable[] a mobile phone or wireless device to use context inference techniques to sense the user's environment and in response, to provide useful information to the user that is appropriate to the user's perceived environment." Ex. 1006, code (57). The method includes: receiving sensor signals characterizing a current environment of the wireless device; processing the signals using a context inference engine; providing a current context result produced by the context inference engine; and providing information to the user in response to the current context result. *Id*. at 1:54–60.

3. Preamble and Limitation 1[a]

The preamble and limitation 1[a] of claim 1 recite "[a] method, comprising: receiving, from a mobile device, event data derived from contextual data collected using detectors that detect a physical context surrounding the mobile device." Ex. 1001, 10:30–33. Snap asserts that Nitz teaches a "method," i.e., a "device, method, and system for automatically inferring a mobile user's current context." Pet. 8 (citing Ex. 1005, code (57)).

Snap also contends that Nitz teaches the "receiving" step of limitation 1[a] because Nitz's system "integrates multiple sources/types of information about a mobile device/user's virtual/physical existence." Pet. 8–9 (citing Ex. 1005, 4:32–36, Fig. 1; Ex. 1002 ¶¶ 69–80). More specifically, Snap asserts Nitz discloses various sensors (detectors) that detect a physical context surrounding the mobile device such as "accelerometers" and "GPS" may be "integrated with the mobile electronic device" and provide real-time inputs. *Id*. at 11 (citing Ex. 1005, 2:16–19, 7:11–30). Snap argues that these inputs are contextual data. *Id*. at 12 (citing Ex. 1001, 3:1–4; Ex. 1002 ¶¶ 72–73). Snap also asserts that Nitz teaches that event data is derived from contextual data where, for example, "real-time inputs from motion sensors may be interpreted to create an 'associated high-level characterization' that the user 'may simply be "walking."'" *Id*. (citing Ex. 1005, 14:21–26). Petitioner contends that associations may be generated by the inference engine, which can use automated reasoning methods to make inferences. *Id*. at 12 (citing Ex. 1002 ¶ 74; Ex. 1005, 4:41–52, 14:21–31).

PARC does not contest Snap's arguments regarding the preamble[13] or limitation 1[a]. *See generally* PO Resp. We find those arguments persuasive, and we credit Mr. Smoot's supporting testimony. *See* Ex. 1002 ¶¶ 66–80.

[13] The preamble merely indicates that the claimed invention is a method, which we presume limits the scope of claim 1. But we need not resolve that question because neither party raises the issue and Snap shows sufficiently that Nitz discloses a method.

4. Limitation 1[b]

Limitation 1[b] recites "modifying a context graph that stores facts and assertions about a user's behavior and interests using the event data." Ex. 1001, 10:34–36.

Snap asserts that Nitz teaches a context graph. Pet. 15–17. For this teaching, Snap relies upon Nitz's disclosure of a knowledge base, which stores rules, templates, and models, such as a probabilistic, semantic, and contextual. *Id*. at 15–16 (citing Ex. 1005, 14:26–31, 17:38–47, 18:19–37). Snap argues that "[t]hese models and related information are used to store facts and assertions about the user's behavior and interests." *Id*. at 16 (citing Ex. 1005, 17:5–23, 17:38–47, 17:60–18:5,18:19–28; Ex. 1002 ¶ 81). Snap contends that the models and related contextual information stored in Nitz's knowledge base is a context graph. *Id*. at 17 (citing Ex. 1002 ¶ 84).

Alternatively, Snap argues that a person of ordinary skill in the art would have modified Nitz to store user information in the form of a graph with nodes and edges as disclosed in several disclosures incorporated by reference into Nitz (Ex. 1005, 12:2–8, 12:42–67), because such graph-based structures "would have provided a known way to structure and maintain the contextual information/models in the knowledge base that would have facilitated efficient and effective access and analysis of such information for use in creating/presenting candidate actions, consistent with *Nitz*'s processes." Pet. 17–18 (citing Ex. 1005, 1:8–25, 4:31–5:43, 13:32–58; Ex. 1002 ¶ 85).

For example, Nitz discloses that "semantic meanings" may be extracted from real-time inputs, such as disclosed in Donneau-Golencer (Ex.

1015).[14] Ex. 1005, 12:39–51. Donneau-Golencer describes extracting relationships between unstructured data to form relationships such as shown in Exhibit 8, reproduced below:

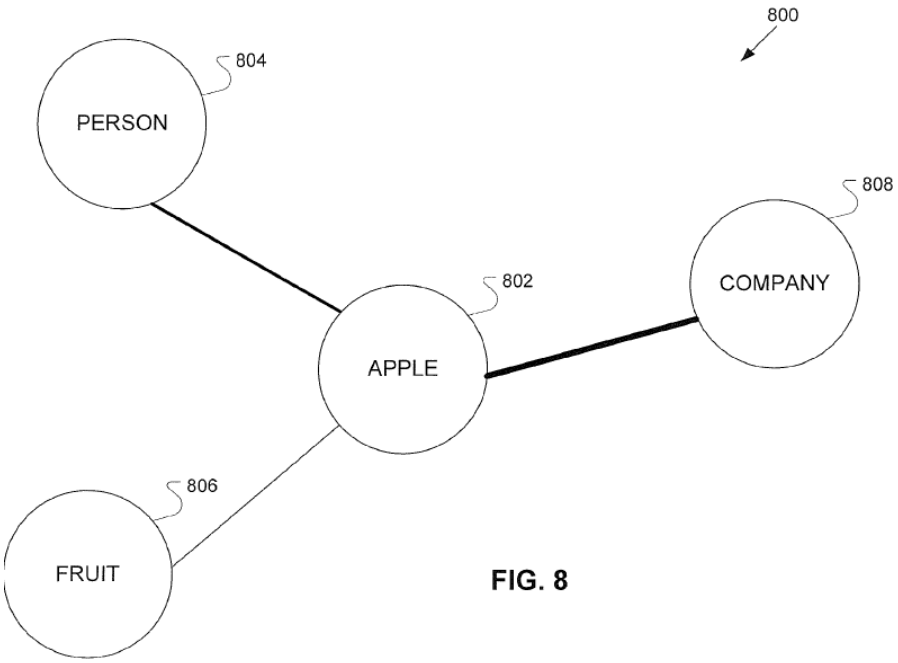

FIG. 8

Figure 8 of Donneau-Golencer, reproduced above, "shows the possible relationships that may be defined between the word "Apple" 802, as discovered in unstructured data, and the various types of entities, e.g., a person 804, a fruit 806, or a company 808." Ex. 1015, 7:54–58. Each entity is depicted in a circle, and the relationships are depicted as connecting lines. Given Donneau-Golencer and other references such as Cheng (US 7,835,578 B2, Ex. 1013 ("analyzing video and automatically generating semantic descriptions," Ex. 1005, 12:59–61)), Snap contends that a person of ordinary skill in the art would have "configure[d] the contextual

[14] Donneau-Golencer, US Application No. 13/287,985, issued as US 9,245,010 B1 on Jan. 26, 2016. Although Nitz incorporated the application by reference, we cite the issued patent (Ex. 1015).

information/models in [Nitz's] knowledge base in a 'context graph' represented logically by such known graph configurations (e.g., edge, node, topological characteristics) because such features would have assisted the knowledge base's abilities in maintaining, accessing, updating, and sharing contextual data for generating accurate candidate actions." Pet. 19–20.

Snap additionally asserts that Nitz teaches modifying the context graph by its disclosure that templates, models, rules, and patterns are "automatically modified and adapted to the user's personal lifestyle" and include "the user's current situation and/or context." Pet. 20–21 (citing Ex. 1005, 14:3–8, 14:55–58, 3:23–25, 13:46–51, 26:9–23; Ex. 1002 ¶ 92). Further, Snap refers to Nitz's disclosure of adaptively modifying rules, patterns, and related contextual information and continuously monitoring and analyzing the real-time inputs and post current situation data in the knowledge base as support for the teaching. *Id*. at 21 (citing Ex. 1005, 26:9–18, 13:46–51; Ex. 1002 ¶ 94.)

In its Response, PARC contends that Nitz does not disclose or teach a "context graph" as PARC construes that term, which requires it to be a "graph-based model." PO Resp. 16; *see also* PO Sur-reply 8. Responding to Snap's alternative argument based on Nitz's incorporated references, PARC argues that these references "fail to describe a graph-based model for storing facts and assertions about a user's behavior and interests." PO Resp. 16. Specifically in reference to Donneau-Golencer, PARC contends that "[c]reating tags and inferences from data, as described in Exhibit 1015, says nothing about how the data is stored." *Id.* at 17 (Ex. 2004 ¶ 97). According to PARC, "[r]elationships and associations between objects stored in memory can be expressed in many different ways that are not graphs (e.g.,

linked lists, vectors, queues), so the use of these words does not mandate the use of a graphical data structure." *Id.* at 18 (citing Ex. 2004 ¶ 95). PARC also contends that "Snap's generic assertion of increased efficiency and conserving resources is legally insufficient to provide a motivation to combine" because "Nitz does not disclose a graph-based model, and changing Nitz because it would be 'efficient and effective' is nothing more than a bare conclusion based on impermissible hindsight." *Id.*

In its Reply, Snap argues that PARC "does not dispute that *Nitz* discloses the claimed context graph under [Snap]'s applied interpretation defined by the '439 patent." Pet. Reply 7–8 (citing Ex. 1001, 3:18–22; Ex. 1036 ¶¶ 32–39, 43, 45–51, 103–104).

As to the Snap's alternative argument relying on incorporated references such as Donneau-Golencer, Snap argues that, for example, Donneau-Golencer "describes a graph-based model with nodes and edges (Ex. 1015, Fig. 8) that is consistent with [PARC]'s construction (i.e., "per-user" and "graph-based"), especially in light of [PARC]'s expert's testimony regarding the generic nature of the '439 patent's 'context graph'"—referring to Dr. Martin's cross-examination testimony allegedly agreeing that "the '439 patent's 'context graph' does not have to be cyclic . . . and has no restrictions on (i) the number of nodes or edges . . . , (ii) directionality of the edges . . . , and (iii) the pattern like that expressed in Fig. 4." Pet. Reply 9 (citing Ex. 1029, 77:19–78:2; then citing *id.* at 54:7–55:6; then citing *id.* at 77:10–18; and then citing *id.* at 57:11–60:4). According to Snap, PARC ignores that Nitz refers to Donneau-Golencer "for exemplary techniques to aid in the classification and association of *Nitz*'s real-time inputs 116 and stored information 118 . . . , which . . . relevant to consideration as to how

'associations' between contextual data corresponding to the real-time inputs could be configured in a node/edge-based model." *Id.* at 11 (citing Ex. 1005, 12:32–51, Ex. 1015; Ex. 1036 ¶¶ 110–111); *see also id.* at 11 n.7 (arguing that the '439 patent, like Donneau-Golencer, contemplates storing data models for "*unstructured* data" (citing Ex. 1001, 7:38–40; Ex. 1005, 12:42–48; Ex. 1029, 32:5–33:1, 40:18–47:15; Ex. 1036 ¶ 110)). Snap argues that its articulation of a reason to combine is not conclusory, and that PARC's accusation of impermissible hindsight is unavailing, given that it is based on documents explicitly incorporated into Nitz. *See id.* at 13–14 (citing Ex. 1002 ¶¶ 91–92; Ex. 1036 ¶¶ 105–106)

In its Sur-reply, PARC argues that Snap "fails to explain why a [person of ordinary skill in the art] would have been motivated to alter Nitz's 'knowledge base' in light of the disclosures contained in" Nitz's incorporated references. PO Sur-reply 8; *see also id.* at 9–10 (specifically making this argument as to Donneau-Golencer).

As we discuss above, we do not construe the term "context graph" to necessarily require data to be stored in the form of nodes and edges. *See supra* Section IV.B. Rather, the '439 patent contemplates that a "context graph" may have an "entity-relationship" structure, or even "unstructured data." Ex. 1001, 7:38–40. Snap has persuasively shown that an "entity-relationship" structure would include entries stored in a traditional relational database, and that Nitz stores facts and assertions about a user's behavior and interests in this form. *See* Pet. Reply 3–4; Ex. 1036 ¶¶ 49–50.

We also find persuasive Snap's alternative argument based on combining Nitz with the teachings of its incorporated references such as Donneau-Golencer. For example, Donneau-Golencer clearly describes

forming a graph structure, with nodes and edges, to represent relationships between people and other entities. *See* Ex. 1015, 7:54–63, Fig. 8. The evidence of record indicates that any implementation details involved in modifying Nitz based on the teachings of Donneau-Golencer and other references would have been within the ordinary skill in the art, and Nitz specifically points to these references as describing ways to organize and conceptualize real-time information about a user. *See* Ex. 1005, 12:2–67. Donneau-Golencer also teaches a context graph that is "per-user," especially when considering its application in Nitz to storing user-specific information. *See, e.g.*, Ex. 1015, Fig. 8; Ex. 1005, 1:29–39. These proposed combinations do not rely on impermissible hindsight reconstruction because they "take[] into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made and do[] not include knowledge gleaned only from applicant's disclosure." *In re McLaughlin*, 443 F.2d 1392, 1395 (CCPA 1971).

Moreover, to the extent that Donneau-Golencer or other incorporated references do not specifically *store* facts and assertions about a user's behavior and interests in the form of nodes and edges, the '439 patent does not identify the precise way in which nodes and edges are stored in a context graph. *See* Ex. 1001, 7:37–39 ("Context graph 406 may store data according to different data models, including data models for entity-relationship data and unstructured data."). In light of Nitz and the incorporated disclosures such as Donneau-Golencer, nodes and edges reflecting facts and assertions about a user's behavior could be stored in any way known in the art at the time of the claimed invention in the view of a person of ordinary skill in the art.

For the above reasons, we find that Snap has persuasively shown that Nitz discloses limitation 1[b].

5. Limitation 1[c]

Limitation 1[c] recites, "in response to determining that there exists a registration for notification of changes that matches the modification to the context graph, sending a notification of context graph change to a recommender." Ex. 1001, 10:37–40. For this limitation, Snap relies on the combination of Nitz and Nykänen. *See* Pet. 22–28.

In particular, Snap asserts that Nitz discloses a mobile advisor that "acts on user-specific current situation and context as it evolves to provide timely and relevant assistance to the user" and also includes an action generator module. Pet. 22 (citing Ex. 1005, 5:11–20, 28:12–13). Snap contends that Nitz's action generator generates candidate actions, such as notifications, recommendations, or sending messages, based on a user's current situation. *Id.* (citing Ex. 1005, 5:20–55). Snap refers to Nitz's execution/presentation module, which determines how to perform and present selected actions at the mobile device. *Id*. at 22–23 (citing Ex. 1005, 5:56–62, 20:7–20). Snap asserts that the mobile advisor and the action generator each is an example of a recommender because they are software-based processes that recommend items or activities for a user. *Id*. at 23–24.

Snap also asserts that Nitz describes push mechanisms for components to automatically transmit data to other components for events as they occur or on a periodic basis. Pet. 24 (citing Ex. 1005, 13:50–56). In view of this, Snap asserts that a person of ordinary skill would have understood that Nitz discloses providing data from the knowledge base for

use by the mobile advisor or action generator (the "recommender"). *Id*. (citing Ex. 1002 ¶ 101).

Snap also contends that, although Nitz does not disclose determining whether a registration for notification of changes exists that matches the context graph modification and sending a notification of a context graph change to a recommender, a person of ordinary skill would have implemented such features in view of Nykänen. Pet. 24 (citing Ex. 1002 ¶ 102). Snap refers to Nykänen's disclosure of a context inference engine that provides user context to application programs. *Id*. at 25 (citing Ex. 1006, 3:10–13). Snap further refers to Nykänen's disclosures that applications may register themselves and would receive changes in context. *Id*. (citing Ex. 1006, 14:1–4, 9:42–46, 17:4–9, Fig. 3).

Snap argues that a person of ordinary skill in the art would have been motivated to modify Nitz's system/method to allow the recommender to register for and receive notifications of matching context graph changes only, rather than having all data, changed or unchanged, sent. *Id*. at 25–26 (citing Ex. 1002 ¶¶ 103–105). Snap notes that Nitz's discloses that a user's current situation and context is stored in the knowledge base, and asserts that a person of skill would have recognized a benefit of the recommender registering for notifications to receive only *changes* in the context graph, rather than receiving all of the data in the knowledge base including unchanged data. *Id*. at 26 (citing Ex. 1002 ¶ 106). According to Snap, the ordinarily skilled artisan would have understood that this modification would preserve resources, since it would avoid generating unnecessary candidate actions. *Id.* at 27 (citing Ex. 1002 ¶ 107).

In its Response, PARC contends that the combination of Nitz and Nykänen omits certain aspects of limitation 1[c]. In particular, PARC argues that Nitz discloses pushing data "automatically or periodically," what is being pushed is the actual *data*, not a *notification* of the data. PO Response 20–21 (citing Ex. 1005, 13:46–56). Because the real-time data is sent automatically and periodically, PARC contends that there would have been no need to register for changes. *Id.* at 21 (citing Ex. 2004 ¶¶ 104–105); *see also id.* at 25. PARC disagrees with Snap that it would have been obvious to modify Nitz to send a *notification* because the idea of notification is entirely missing in both Nitz and Nykänen. *Id.* at 25–26 (citing *Orexo AB v. Actavis Elizabeth LLC*, 903 F.3d 1265, 1271 (Fed. Cir. 2018)); *see also id.* at 21–22 (citing Ex. 1006, 6:35–41, 9:42–45, 10:16–19; Ex. 2004 ¶¶ 101–103) (arguing that Nykänen teaches sending the data itself, not a notification of change). Because the combination allegedly does not teach registering for or sending notifications, PARC contends that the combination also does not teach determining whether a registration matches a modification to the context graph. *Id.* at 24–25 (citing Ex. 2004 ¶¶ 107–109).

PARC also argues that Nykänen's registration is "to prevent unauthorized programs from accessing a mobile device user's private data," which "has nothing to do with preserving resources" as Snap alleges, and the applications that register for data in Nykänen, as well as the data itself, are on the same mobile device, so that device already has all the data an does not need a notification of changes. PO Resp. 23 (citing Ex. 1006, Fig. 2; Ex. 2004 ¶¶ 101–103); *see also* PO Sur-reply 14–15 (citing Ex. 1006, 6:32–38, 15:58–16:1) (arguing that the passages Snap relies on in Nykänen for the motivation to combine make no mention of conserving resources or sending

of notifications, and to the extent one of the passages refers to Nykänen's registration feature, the concern is to prevent unauthorized access).

In its Reply, Snap argues that when Nitz refers to pushing data "automatically" or "periodically," it is referring to pushing the data to Nitz's knowledge base, not to the mobile adviser or action generator ("recommender"). Pet. Reply 14–15; *see* Ex. 1005, 13:51–58. Snap also argues that because these updates to the knowledge base are periodic, a person of ordinary skill in the art would have recognized a need for the alleged recommender to be notified whenever these changes occur. Pet. Reply 15 (citing Ex. 1002 ¶¶ 103–113; Ex. 1036 ¶ 117).

Also, Snap argues that neither Nitz nor Nykänen require sending all data, and Nitz suggests that "a user may specify that only certain types of data/situations/contexts be used to determine contextual data for generating/presenting candidate actions," thus suggesting the usefulness of selectivity in the data that would be processed or presented to a user. Pet. Reply 15–16 (citing Ex. 1005, 18:46–56, 18:59–19:8, 24:15–20, 26:40–53; Ex. 1036 ¶¶ 118, 183).

As to PARC's argument that Nykänen has nothing to do with preserving resources, and that the application already has access to all the data and only sends the data itself rather than a notification, Snap counters that PARC ignores that Nykänen "describes features concerning limiting data access, use of a notification before sending data, and identifying whether there is a need to transfer information, which are all consistent with rationales provided in the Petition for modifying *Nitz*'s system." Pet. Reply 17–18 (citing Ex. 1006, 14:64–16:13; Ex. 1029, 173:20–176:2; Ex. 1002 ¶¶ 104–108, 110–111; Ex. 1036 ¶ 119). Snap also argues that the Petition

and Mr. Smoot's testimony provide specific justification for the "match[ing]" aspect of limitation 1[c]. *Id.* at 19–20 (citing Pet. 25, 27, 28; Ex. 1002 ¶¶ 98–112).

In its Sur-reply, PARC argues that there are passages in Nitz suggesting that candidate actions are already delivered to the user in a timely manner, so a person there would have been no reason to provide notifications of data changes as opposed to providing the data itself. PO Sur-reply 11–12 (citing Ex. 1005, 5:15–17, 6:9–11, 15:61–64, 19:22–24). PARC also argues that there will be no delay because Nitz automatically updates the knowledge base in real time. *Id.* at 12–13 (citing Ex. 1002 ¶ 101). And according to PARC, Snap's contention in the Reply that neither Nitz nor Nykänen necessarily require sending all data to the alleged recommender contradicts its earlier argument that a reason to modify Nitz is to avoid sending all the data. *Id.* at 13. Finally, PARC argues that Snap has failed to meet its burden to explain how the Nitz–Nykänen combination would actually determine whether a registration matches a modification to the context graph. *Id.* at 15–17.

We find Snap's arguments sufficiently specific and persuasive that a person of ordinary skill in the art would have had reason to modify Nitz with the teachings of Nykänen to provide all aspects of limitation 1[c]. In particular, we agree with Snap that Nitz's mobile adviser 120 or action generator 122 corresponds to the recited "recommender." *See* Ex. 1002 ¶ 100. Although Nitz teaches the need for providing timely recommendations to a user, we find persuasive Snap's argument and supporting expert testimony that a person of ordinary skill in the art would have regarded Nitz's solution to providing timely recommendations to be

inefficient to the extent that Nitz pushes all data to the recommender, changed or unchanged. Ex. 1002 ¶¶ 105, 107. As Nitz itself recognizes, a recommender does not necessarily need access to everything in its knowledge base for every recommendation. *See id.* ¶ 107 (citing Ex. 1005, 18:46–56); Ex. 1036 ¶ 116. Thus, for the reasons Snap argues, we agree that a person of ordinary skill in the art would have looked to Nykänen to address this inefficiency.

In particular, Nykänen teaches that there is no need to transfer information from a knowledge base ("context graph") if there is no relevant event or change in the context of the mobile device. Ex. 1036 ¶ 119 (citing Ex. 1006, 14:64–67). In contrast to Nitz, where all the data from the context graph is pushed to the recommender. Nykänen provides a solution in which applications may register to receive "any changes to specific context information" in a context graph. Ex. 1002 ¶ 103 (quoting Ex. 1006, 14:1–4) (citing Ex. 1006, 9:42–46). We are persuaded that a person of ordinary skill in the art would have understood Nykänen's teaching that the registration is for changes to "specific context information," and Nykänen's teachings as a whole, to indicate that the notification is for changes that *match* a specific subset of context information that the application is registered for. *See* Pet. Reply 19 (citing Ex. 1002 ¶¶ 108, 109, 111).

We disagree with PARC that Nykänen's registration system only concerns the need to prevent unauthorized access. Nykänen also teaches that its registration system "enables context sensitivity in the application programs." Ex. 1006, 9:45–46; *see also* Ex. 1002 ¶ 103. We also disagree with PARC that Nykänen only discloses sending data, not notifications of data, because as Dr. Almeroth credibly explains, Nykänen teaches access

levels, one of which provides a notice of context graph changes before providing access to the data. Ex. 1036 ¶ 119 (citing Ex. 1006, 6:34–64).

Thus, we determine that Snap has shown that the combination of Nitz and Nykänen teaches limitation 1[c] and that a person of ordinary skill in the art would have combined the two references as Snap proposes.

6. Claims 7 and 13

Independent claims 7 and 13 are directed to a "computer-readable storage medium" and a "computing system," respectively, that implement essentially the same method as claim 1. *Compare* Ex. 1001, 10:30–40, *with id.* at 11:1–13, *and id.* at 11:47–12:7. For these claims, Snap relies on substantially the same arguments it presented for claim 1. *See* Pet. 38–40 (claim 7) (citing Ex. 1002 ¶¶ 129–133); Pet. 42–44 (claim 13) (citing Ex. 1002 ¶¶ 139–143). PARC does not present any arguments separately addressing independent claims 1, 7, and 13. *See generally* PO Resp.

7. Conclusion as to Claims 1, 7, and 13

For all reasons discussed in the sections above, we determine that Snap has shown by a preponderance of the evidence that independent claims 1, 7, and 13 are unpatentable as obvious over Nitz in view of Nykänen.

D. CLAIMS 2, 8, AND 14

Claims 2, 8, and 14 depend from independent claims 1, 7, and 13, respectively, and further recite the following additional steps: (a) "receiving, from the mobile device, additional event data including application event data and/or operating system event data;" (b) "modifying the context graph based on the additional event data;" (c) "determining that the modification to

the context graph matches the registration;" and (d) "sending a second notification of context graph change to the recommender." Ex. 1001, 10:41–50 (claim 2); *accord id.* at 11:14–26 (claim 8); *id.* at 12:8–20 (claim 14). Essentially, these claims repeat the steps of claim 1 except with regard to "additional event data including application event data and/or operating system event data." *Id.* at 10:42–44. For these limitations, Snap relies on Nitz and Nykänen in an analogous way to that discussed above in the context of claim 1. *See* Pet. 29–33, 40–42, 44–45; *supra* Section IV.C.

PARC does not specifically address the added limitations in claims 2, 8, or 14, but argues that "the combination of Nitz and Nykänen does not disclose a context graph that stores facts and assertions about a user's behavior and interests, determining a match, or a notification of context graph change" as argued in the context of the independent claims.

For the reasons discussed above, we determine that Snap as shown, by a preponderance of the evidence, that claims 2, 8, and 14 are unpatentable as obvious over Nitz in view of Nykänen. *See supra* Section IV.C.

E. CLAIMS 3, 4, 9, 10, 15, AND 16

Claims 3, 9, and 15 depend from claims 1, 7, and 13, respectively, and further recite that "the event data includes high-level event data generated by the mobile device from contextual data." Ex. 1001, 10:51–53 (claim 3); *accord id.* at 11:27–29 (claim 9); *id.* at 12:21–23 (claim 15). For these claims, Snap relies its arguments for the independent claims as well as Nitz's disclosure of low-level events such as "interactions with the mobile device relating to electronic content, communications, or software applications" and

high-level events such as inferences based on the user's location data. Pet. 33–35 (quoting Ex. 1005, 18:19–28) (citing Ex. 1005, 18:29–37), 42, 45–46.

Claims 4, 10, and 16 depend from claims 1, 7, and 13, respectively, and further recite steps of "receiving a query for context graph data from the recommender; and sending the context graph data to the recommender." Ex. 1001, 10:54–57 (claim 4); *accord id.* at 11:30–34 (claim 10); *id.* at 12:24–30 (claim 16). According to Snap, Nykänen teaches that applications request, and receive, current context information from the inference engine, and that it would have been obvious to modify Nitz's system to allow the recommender to request and receive specific contextual information as needed, rather than just waiting for notifications. *See* Pet. 35–38, 46–47.

Apart from its arguments discussed above in the context of claim 1, PARC does not contest Snap's specific showing for claims 3, 4, 7, 9, 10, 13, 15, or 16. *See* PO Resp. 26–56. We find those arguments persuasive, and credit Mr. Smoot's supporting testimony. *See supra* Section IV.C.

For all the reasons above, we determine that Snap has shown that claims 3, 4, 7, 9, 10, 13, 15, and 16 are unpatentable as obvious over Nitz in view of Nykänen.

F. CLAIMS 5, 11, AND 17

Claims 5, 11, and 17 depend from claims 1, 7, and 13, respectively, and further recite "receiving real-time event data through a RESTful WebAPI; and modifying the context graph based on the received real-time event data." Ex. 1001, 10:58–62 (claim 5); *accord id.* at 11:35–40 (claim 11); *id.* at 12:31–38 (claim 17). In Ground 3, Snap relies on Chang (US 2012/0046966 A1, published Feb. 23, 2012, Ex. 1008).

Chang describes a health monitoring system to collect raw health data, process the data, store health knowledge, and provide notifications to users. Ex. 1008, code (57), ¶ 5. Chang discloses that an open application programming interface (API) can enable the development of more value-added services. *Id.* ¶ 27. Chang also discloses that "[t]o enable an open platform, in one embodiment, we adopt Web services (i.e., RESTful API) to provision the wellness management functionalities." *Id.* ¶ 34. Chang further discloses that "[a]s is known, RESTful web service (also called a RESTful web API) is a simple web service implemented using HTTP (HyperText Transfer Protocol) and the principles of REST (Representational State Transfer)." *Id.* ¶ 36.

Snap asserts that Nitz discloses receiving event data and modifying a context graph based on the received event data. Pet. 52 (citing Ex. 1002 ¶ 163). Snap contends that Nitz also discloses that the event data may be posted to the knowledge base by real-time inputs and that the inference engine can "automatically respond to the user's current situation and context" and that "data is posted to the knowledge base 130 automatically as it occurs." *Id*. (citing Ex. 1005, Figs. 1, 3, 1:29–33, 4:53–57, 5:11–13, 13:51–58; Ex. 1002 ¶ 163). Snap asserts that, although Nitz does not disclose that its knowledge base receives event data via RESTful WebAPI mechanisms and techniques, Restful WebAPI was a known simple web service which supports HTTP methods, and it would have been obvious to a person of ordinary skill in the art to modify Nitz–Nykänen to implement RESTful WebAPIs as demonstrated by Chang. *Id*. at 52–53 (citing Ex. 1002 ¶ 163). Snap argues that Chang explains that RESTful WebAPI, a simple web service, supports HTTP methods such as POST, GET, PUT or

DELETE, and implementation in Nitz would have been a predictable and straightforward application of well-known technologies/methods. *Id*. at 53 (citing Ex. 1008 ¶ 36; Ex. 1002 ¶¶ 59–61, 164–165).

Snap also asserts that a person of skill would have had reason to consider Chang's disclosures in view of Nitz because Chang discloses features in a similar technological field, that is, collecting/monitoring real-time data from sensors that are provided to a knowledge repository and provide services to users. Pet. 54 (citing Ex. 1002 ¶ 166). Snap contends that a person of skill would have understood that the use of RESTful WebAPI was a foreseeable and logical modification to Nitz for the receipt of real-time data from a mobile device and was an alternative and known way to update contextual information in a knowledge base through known web service technologies. *Id*. (citing Ex. 1002 ¶¶ 167–168).

PARC does not contest Snap's specific showing for claims 5, 11, or 17. *See* PO Resp. 26–56. We find those arguments persuasive, and credit Mr. Smoot's supporting testimony. For all the reasons above, we determine that Snap has shown that 5, 11, and 17 are unpatentable as obvious over Nitz in view of Nykänen and Chang.

G. CLAIMS 6, 12, AND 18

Claims 6, 12, and 18 depend from claims 1, 7, and 13, respectively, and further recite "receiving bulk upload of event data through an event posting interface; and modifying the context graph based on the received bulk upload event data." Ex. 1001, 10:63–67; *accord id.* at 11:41–46; *id.* at 12:39–46. In Ground 2, Snap relies on Mishra (US 2012/0135751 A1, Ex. 1007).

Mishra describes a system and processes for determining the current geographic location of a computing device based on received communication data, as well as defining user reaction data based on user input indicative of a user reaction to receipt of communication data. Ex. 1007, code (57), ¶ 6. Mishra's system defines rules for reacting to received communication data based on the user reaction data and location data, and responds to subsequent communications based on the rules by performing actions at the device. *Id.* ¶¶ 4–5. Mishra discloses maintaining context data in models that stores facts and assertions about the user's behavior and interests. *Id.* ¶ 39. Mishra discloses bulk data uploads of context information to a server via an interface, including uploads from mobile devices. *Id.* ¶¶ 20, 32–33, 59.

Snap argues that, although Nitz discloses receiving event data and modifying the context graph based on event data, it does not disclose bulk uploading of event data. Pet. 47–48. Snap asserts that a person of ordinary skill would have been motivated to use Mishra's known concept and related technologies for providing bulk data uploads of context information to a server via an interface in the Nitz–Nykänen combination because of its advantages in advancing Nitz's operations. *Id*. at 48–49 (citing Ex. 1002 ¶¶ 155–157; Ex. 1007 ¶ 20, 32–39, 48, 59). Snap argues that a person of skill would have recognized that Nitz discloses data is posted to the knowledge base on a periodic basis, and Mishra's bulk data uploads "would have been a foreseeable way to efficiently update the knowledge base." *Id*. at 50 (citing Ex. 1002 ¶ 158).

PARC does not contest Snap's specific showing for claims 6, 12, or 18. *See* PO Resp. 26–56. We find those arguments persuasive, and credit Mr.

Smoot's supporting testimony. For all the reasons above, we determine that Snap has shown that claims 6, 12, and 18 are unpatentable as obvious over Nitz in view of Nykänen and Mishra.

H. CLAIM 19

Claim 19 depends from claim 1 and further recites "sending a second notification to the recommender by pushing events into the recommender's publish/subscribe system asynchronously using a long-poll persistent push connection." Ex. 1001, 12:47–51. For its Ground 4, Snap relies on its arguments for claim 1 as well as the teachings of Mccolgan (US 2012/0096114 A1, Published Apr. 19, 2012, Ex. 1009).

Mccolgan is directed to a method and system for asynchronously communicating updated information related to a service to a device. Ex. 1009, code (57). Mccolgan is further directed to a presence service that captures presence information from sources that compose metadata and distributes a raw presence metadata document to authorized watchers and a presence platform that receives, stores, updates and sends out presence information. *Id*. ¶¶ 6, 41. Mccolgan discloses that "a contextually aware platform that exposes relevant 'aspect triggers' on behalf of a content delivery service provides useful means for notifying or pushing relevant information to an associated subscriber base." *Id*. ¶ 187. Mccolgan discloses that when a trigger fires, the corresponding action "may be sending or pushing relevant information to an appropriate client device." *Id*. ¶ 188.

Snap asserts that Nitz discloses a recommender and the combination of Nitz and Nykänen discloses sending notification of context graph change to the recommender. Pet. 57. Snap argues that although Nitz does not

expressly disclose that the recommender has a publish-and-subscribe system and pushes events into that system, it would have been obvious to one of ordinary skill in the art to modify the combination in view of Mccolgan. *Id*. (citing Ex. 1002 ¶ 172). Snap contends that Mccolgan's presence service captures presence information from sources and distributes a raw presence metadata document to authorized watchers, and further that the content delivery service provides means for pushing relevant information to an associated subscriber base. *Id*. at 57–58 (citing Ex. 1000 ¶¶ 6, 41, 187). Snap asserts that Mccolgan also discloses asynchronous transmission of aspect trigger indications, which may be facilitated through a long-poll or open-stream type HTTP 1.1 GET or POST operations. *Id*. at 58 (citing Ex. 1009 ¶ 259; Ex. 1002 ¶¶ 62–64, 173–174).

Snap argues that one of ordinary skill in the art would have considered Mccolgan in view of Nitz because Mccolgan discloses context aware mechanisms in a mobile device-based system, which is similar to Nitz's context-based features. Pet. 58 (citing Ex. 1002 ¶ 175). Snap asserts that a person of ordinary skill in the art would have appreciated the guidance provided by Mccolgan relating to publishing data to a subscriber in the context of Nitz's presentation features. *Id*. at 59 (citing Ex. 1009 ¶¶ 187–188; Ex. 1002 ¶ 176). Snap further contends that a person of skill would have recognized the benefit of allowing the knowledge base to push event data to the recommender's publish/subscribe system using known push technologies to ensure relevant candidate actions would be generated to appropriate recipients in a timely fashion, without requiring requests from the mobile device. *Id*. at 60–61 (citing Ex. 1002 ¶ 178).

In its Response, PARC first argues that Mccolgan is non-analogous art because it concerns push-to-talk technology over a cellular (PoC) system, which "is entirely different than Nitz's client-centric environment." PO Resp. 28 (citing Ex. 1009 ¶ 39; Ex. 2004 ¶¶ 71, 112–122). Snap replies that Mccolgan discusses a system, like Nitz, that provides presence information on the basis of context, only discusses PoC features as "an example," and teaches that the disclosure is applicable to "other platforms." Pet. Reply 10–21 (citing Ex. 1009 ¶¶ 1–6, 39; Ex. 1036 ¶¶ 121–122).

We disagree with PARC that Mccolgan is non-analogous to the claimed invention, as the disclosures that Snap has identified in Mccolgan are reasonably pertinent to the issue of providing notifications to a recommender for a context-aware system, and Mccolgan would have logically commended itself to an inventor's attention in considering this problem. *See In re Clay*, 966 F.2d 656, 659 (Fed. Cir. 1992).

Second, PARC contends that Mccolgan sends alleged notifications and pushes alleged events to the mobile device user rather than the recommender's system. PO Resp. 28–29 (citing Ex. 1009 ¶¶ 46, 51–53, 237–238; Ex. 2004 ¶¶ 112–113, 122). Snap replies that its proposed combination relies Mccolgan for its teaching of providing recommendations (to any entity) by pushing events asynchronously using a long-poll persistent push connection, but relies on Nitz and Nykänen for the teaching that the receiver would be a recommendation system. *See* Pet. Reply 21–22 (citing Ex. 1005, 25:56–26:8; Ex. 1039 ¶ 122; Ex. 1009 ¶¶ 187–188).[15] PARC

[15] Snap argues that "the recommender's publish/subscribe system" has no antecedent basis and lacks written-description support in the '439 patent. Pet. 56–57 n.10; Pet. Reply 22; *see also* PO Sur-reply 18–19 (responding to

responds that Snap "argues it would have been obvious to take Mccolgan's teachings and do something none of Nitz, Nykänen, or Mccolgan teach." PO Sur-reply 18 (citing *In re Smith Int'l*, 871 F.3d 1375, 1384 (Fed. Cir. 2017)).

We disagree with PARC that one of Nitz, Nykänen, or Mccolgan needs to individually teach the limitations of claim 19. *See In re Keller*, 642 F.2d 413, 425 (CCPA 1981) ("The test for obviousness is not . . . that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art.").

Finally, PARC argues that Nitz and Nykänen already present or publish data to users automatically or periodically, so a person of ordinary skill in the art would not have looked to Mccolgan for teachings in that regard. PO Resp. 29–30 (citing Ex. 1005, 13:51–55; Ex. 1006, 15:61–64; Ex. 2004 ¶¶ 121–122); *see also* PO Sur-reply 19–20 (citing Ex. 1005, 5:15–17, 6:9–11, 15:61–64, 19:22–24) (arguing that Nitz and Nykänen already teach timely solutions, so looking to Mccolgan is impermissible hindsight). Snap replies that a person of ordinary skill in the art "would have had reasons to consider contemporaneous disclosures that describe known ways to provide relevant information for 'context awareness,' like *Mccolgan* in the context of *Nitz*," including disclosures that happen automatically. Pet. Reply 23–24 (citing Ex. 1009 ¶¶ 1–6, 34–36; Ex. 1029, 170:12–171:3; Ex. 1036 ¶ 122).

We find Snap's arguments persuasive that even though Nitz and Nykänen, or their combination, teach solutions for providing timely data to a

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the arguments). We do not address these issues because they are outside the permissible scope of an *inter partes* review. *See* 35 U.S.C. § 311(b).

recommender, Mccolgan teaches a well-known, predictable way to send notifications, which a person of ordinary skill in the art would have had reason to apply to the recommender in the combined system of Nitz and Nykänen. The use of Mccolgan in this way would be no "more than the predictable use of prior art elements according to their established functions." *KSR*, 550 U.S. at 417.

For all the reasons discussed above, we determine that Snap has shown by a preponderance of the evidence that claim 19 is unpatentable as obvious over Nitz in view of Nykänen and Mccolgan.

I. CLAIM 20

Claim 20 depends from claim 1 and further recites "wherein sending the notification comprises notifying the recommender of topological changes in the context graph and/or changes to individual properties of nodes and edges in the context graph." Ex. 1001, 12:52–55. In addition to its arguments for claim 1, Snap relies on the teachings of Sathish (US 8,010,669 B2, issued Aug. 30, 2011, Ex. 1010).

Sathish is directed to a delivery context client interface (DCCI) based context model. Ex. 1010, code (57), 2:30–38. Sathish discloses that an application may receive notifications if there are new properties added, or for changes to new or existing properties and/or other topology changes, such as the removal of a property. *Id*. at 9:43–49. Satish further discloses that when an event notification is generated or sent, "the corresponding event may [be] captured by the event listener to indicate that the new (or changed) property associated with the corresponding event is available." *Id*. at 9:49–52.

Snap asserts that the combination of Nitz and Nykänen teaches sending a notification of a context graph change to a recommender, but there is no express disclosure of notifying the recommender of topological changes or changes to individual properties of nodes and edges in the disclosed context graph. Pet. 64. Snap argues, however, that a person of ordinary skill in the art would have been motivated to modify the combination of Nitz and Nykänen in view of Sathish. *Id*. at 64–65 (citing Ex. 1002 ¶ 186). Satish teaches that applications may receive notifications of changed properties, including topology changes. Ex. 1010, 9:43–49. Snap asserts that, in view of Sathish, a person of ordinary skill in the art would have been motivated to configure the combination of Nitz and Nykänen to monitor and notify the recommender of topological changes or changes to individual properties of nodes and edges in the context graph and use these changes to generate and present candidate actions. Pet. 66 (citing Ex. 1002 ¶ 189).

Snap asserts that, as discussed for limitation 1[c], it would have been obvious to configure models/contextual-based information in the knowledge base as a context graph to include known topological characteristics and node/edge relationships. Pet. 67. Snap further contends that monitoring and assessing changes in node/edge properties in models for updating information reflected by such data structures was known. *Id*. (citing Ex. 1002 ¶ 191). Snap argues that a person of ordinary skill in the art would have recognized advantages in monitoring changes to topological characteristics and node/edge properties of a context graph because that monitoring would have been helpful in the recommender's processes for

creating/presenting appropriate candidate actions based on the changes. *Id*. (citing Ex. 1002 ¶ 192).

In its Reply, PARC argues that Sathish does not remedy the deficiency of the Nitz–Nykänen combination because Sathish "discloses a tree, not a graph with nodes and edges as claimed." PO Resp. 30–31 (citing Ex. 1010, code (57), 1:10–11, 1:64–2:2, 8:53–54, 10:26–28, 10:36–37). According to PARC, "[a] graph is not a tree," which "is a model having a single root that cannot loop," as opposed to a graph, which is "a network model that need not have a root and its nodes can be interconnected so that they loop." *Id.* at 31 (citing Ex. 2004 ¶¶ 124–125). PARC argues that graphs have advantages in their ability express information about a user's behavior and interests, so a person of ordinary skill in the art would not have looked to Sathish's disclosure of an inferior tree structure. Id. at 31–32 (citing Ex. 2004 ¶¶ 124–130).

In its Reply, Snap contends that a tree is a type of graph that happens to be acyclic, so a "context graph" could also be in the form of a tree structure. Pet. Reply 26–27 (citing Ex. 1032, 1:17–20, 2:33–34, 8:4–9:2, 8:36–31, 11:9–21, Fig. 6; Ex. 1033, 2; Ex. 1044, 2–5; Ex. 1036 ¶ 125). According to Snap, Dr. Martin's testimony supports this view. *Id.* at 25 (citing Ex. 2004 ¶ 124 (Dr. Martin opining for PARC that "a tree can be defined as a directed acyclic graph," whereas "[a] graph that is cyclic (i.e., contains a loop) . . . is not a tree"); Ex. 1029, 54:7–55:6, 57:11–60, 77:10–78:2); *see also id.* at 27 (citing Ex. 1029, 62:19–69:8, 75:3–77:2; Ex. 1036, ¶¶ 125–126.)). Snap also contends that the '439 patent discloses that a context graph can include an entity-relationship data model, which was known to encompass a hierarchical topology like a tree. *Id.* at 28 n.13 (citing

Ex. 1001, 7:38–40; Ex. 1029, 33:22–34:12; Ex. 1030, 13–15; Ex. 1035 ¶ 28; Ex. 1036 ¶ 127).[16]

In its Sur-reply, PARC argues that a tree and a graph are not synonymous because "a graph allows for a variety of additional interconnections that are precluded by a tree," making a tree disadvantageous in the context of the '439 patent. PO Sur-reply 21–22 (citing Ex. 2004 ¶¶ 124–130). PARC also argues that Dr. Martin's testimony does not support Snap's interpretation that a tree is a type of graph, and that the deposition testimony "simply explains that the '439 Patent is not limited to the exact graph depicted in Figure 4." *Id.* at 22 (citing Ex. 1029, 54:7–55:6, 57:11–60:4, 77:10–78:2). As to the other references that Snap cites to support its view that a tree is a type of graph, PARC contends that these references were addressing particular type of trees or graphs that are not relevant to a "context graph" as that term appears the '439 patent. *Id.* at 23 (citing Ex. 1032, 7:1–17, 11:9–16; Ex. 1033, 2; Ex. 1044).

Snap has persuasively shown that a person of ordinary skill in the art would have understood a "tree," as Satish explicitly discloses, to be a type of "graph" as that term was known in the art, and we credit Dr. Almeroth's testimony in that regard. *See* Ex. 1036 ¶ 125.[17] We also credit his testimony

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[16] Alternatively, Snap argues that Sathish's disclosure includes the use of a cyclic graph, and a person of ordinary skill in the art would have had reason to implement it that way. *See* Pet. Reply 24–25 (citing Ex. 1036 ¶ 124); *see also* PO Sur-reply 24–25 (responding to this argument). Because we find Snap's other argument persuasive, we need not address this one.

[17] Exhibit 1031 is reproduced following paragraph 125 of Dr. Almeroth's declaration. As we discuss above, we need not, and do not, consider this exhibit or references to this exhibit in our decision. *See supra* Section III.

that a person of ordinary skill in the art would have understood that the '439 patent does not limit a context graph only to cyclic graphs, but may also include acyclic graphs (trees). *See id.* ¶ 126. While we have considered Dr. Martin's testimony as a whole, we find it pertinent that in his initial declaration, he explicitly defined a "tree" as a type of "directed acyclic *graph*." Ex. 2004 ¶ 124 (emphasis added). This is consistent with, and adds further weight to, Dr. Almeroth's testimony. Thus, we determine that a claim 20 (or its parent claim 1) does not limit a context graph to a cyclic graph, and would also encompass tree-like topologies such as Sathish explicitly discloses.

For all the reasons discussed above, we determine that Snap has shown by a preponderance of the evidence that claim 20 is unpatentable as obvious over Nitz in view of Nykänen and Sathish.

V. PARC'S CONTINGENT MOTION TO AMEND

Because we conclude that all of the challenged claims are unpatentable based on the grounds of the Petition, we consider PARC's Contingent Motion to Amend. *See* MTA (Paper 20) 1 (stating that the Motion to Amend is submitted "to the extent the Board finds any original claim unpatentable in this proceeding").

For the reasons below, we find that each of pending proposed substitute claims 21–40 would introduce new matter, and that they are unpatentable under § 103. Therefore, we deny the Contingent Motion to Amend.

A. PROPOSED SUBSTITUTE CLAIMS

PARC proposes claims 21–40 as substitutes for original claims 1–20 of the '439 patent, respectively. *See* MTA App'x A. Proposed substitute claim 21 is reproduced below, with underlining to indicate the text proposed to be added to original claim 1:

> 21. (Proposed substitute for claim 1, if found unpatentable) A method, comprising:
>
> [a] receiving, from a mobile device, event data derived from contextual data collected using detectors that detect a physical context surrounding the mobile device;
>
> [b] aggregating the event data from multiple mobile device clients for analysis, at a server-side architecture, regarding co-location events;
>
> [c] modifying a context graph that stores facts and assertions about a user's behavior and interests using the event data, wherein the context graph includes nodes shared between two or more users;
>
> [d] in response to determining, at the server-side architecture, that there exists a registration for notification of changes that matches the modification to the context graph, sending, by the server-side architecture, a notification of context graph change to a recommender.

MTA App'x 1 (PARC's reference letters added, and formatting added for consistency with the original claims). PARC proposes similar amendments to independent claims 27, corresponding to original claim 7 (*id.* at 3–4) and 33, corresponding to original claim 13 (*id.* at 5–6).

B. PARC'S BURDEN TO SHOW COMPLIANCE WITH STATUTORY AND REGULATORY REQUIREMENTS

We first consider whether PARC has met its burden to show that it has met the statutory and regulatory requirements for a motion to amend.

"Before considering the patentability of any substitute claims, . . . the Board first must determine whether the motion to amend meets the statutory and regulatory requirements set forth in 35 U.S.C. § 316(d) and 37 C.F.R. § 42.121." *Lectrosonics, Inc. v. Zaxcom, Inc.*, IPR2018-01129, Paper 15 at 4 (PTAB Feb. 25, 2019) (precedential). Accordingly, a patent owner must make a claim listing reproducing each proposed substitute claim (which it has, *see* MTA App'x A), and must make an initial showing to demonstrate the following: (1) the amendment proposes a reasonable number of substitute claims; (2) the amendment responds to a ground of unpatentability involved in the trial; (3) the amendment does not seek to enlarge the scope of the claims of the patent; and (4) the proposed claims are supported in the original disclosure (and any earlier filed disclosure for which the benefit of filing date is sought) without introducing new subject matter. *See* 35 U.S.C. § 326(d); 37 C.F.R. § 42.121.

1. Whether There Is a Reasonable Number of Substitute Claims and Whether the Proposed Amendment Responds to a Ground of Unpatentability Involved in the Trial

PARC contends that it has proposed a reasonable number of substitute claims and that the proposed amendments respond to the patentability grounds involved in this trial. *See* MTA 2–3.

Snap does not challenge the number of proposed claims or whether the proposed amendments respond to issues involved in the trial. *See generally* Pet. Opp. MTA. Because PARC only proposes one substitute claim per original claim challenged in the Petition, we determine that the number of claims is reasonable. We also determine the pending proposed substitute claims only include amendments that respond to issues raised in the Petition.

2. Whether the Proposed Amendment Seeks to Enlarge the Scope of the Original Claims

PARC alleges that its "proposed substitute claims retain all of their original features and add narrowing elements." MTA3. Snap does not contest this. *See generally* Pet. Opp. MTA.

We agree with PARC that the proposed amendment does not seek to enlarge the scope of the original claims.

3. Whether the Proposed Amendment Introduces New Matter

We next consider whether the proposed substitute claims (including material found in the original claims) are supported in the original disclosure and whether the proposed amendment introduces new matter in violation of 35 U.S.C. § 316(d)(3). New subject matter is any addition to the claims that lacks sufficient support in the subject patent's original disclosure. *See TurboCare Div. of Demag Delaval Turbomach. v. Gen. Elec. Co.*, 264 F.3d 1111, 1118 (Fed. Cir. 2001) ("When [an] applicant adds a claim . . . , the new claim[] must find support in the original specification."). The Board requires that a patent owner show in a motion to amend that there is written-description support in the originally filed disclosure of the subject patent for each proposed substitute claim, and also set forth support in an earlier-filed disclosure for each claim for which the patent owner seeks the benefit of the earlier-filed disclosure's filing date. *See* 37 C.F.R. §§ 42.121(b)(1), 42.121(b)(2).

The test for determining whether an amendment lacks written description support in the original disclosure is not simply the presence or absence of literal support in the disclosure for the claim language, but rather,

whether the disclosure as originally filed reasonably conveys to a person of ordinary skill in the art that the inventor had possession of the claimed subject matter at the time of filing. *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc); *Vas-Cath, Inc. v. Mahurkar*, 935 F.2d 1555, 1563 (Fed. Cir. 1991); *In re Kaslow*, 707 F.2d 1366, 1375 (Fed. Cir. 1983).

PARC contends that "the proposed substitute claims are supported by the original non-provisional application and thus do not introduce new subject matter." MTA4. As support, PARC provides the testimony of Dr. Martin including a table that purportedly shows where support for each limitation may be found in the non-provisional parent application, App. No. 13/873,061 ("the '061 application," Ex. 1004). *Id.* (citing Ex. 2004 ¶¶ 53–60). PARC also provides an outline of this support in its Contingent Motion to Amend. MTA5–8.

Snap contends that the proposed substitute claims lack support for the limitation "wherein the context graph includes nodes shared between two or more users" in proposed independent claims 21, 27, and 33 and in the other proposed substitute claims through dependency. *See* Pet. Opp. MTA2–4. According to Snap, the term "nodes" is only mentioned in paragraphs 49 and 51 of the '061 application. *Id.* at 2. As to paragraph 51, Snap argues that it only discloses that changes to a context graph can include changes to properties of the nodes and edges, and does not suggest any sharing of nodes between users. *See* id. at 2 (citing Ex. 1036 ¶¶ 132–133).

Snap argues that paragraph 49 mentions that the "system can manage context graphs with greater number of nodes using cross module interconnections." Pet. Opp. MTA2 (quoting Ex. 1004 ¶ 49). But according

to Snap, this "does not describe to a [person of ordinary skill in the art] that a context graph includes nodes shared between users." *Id.* (citing Ex. 1036 ¶ 134). In Snap's view, this describes "system components and not nodes." *Id.* (citing Ex. 1004 ¶¶ 24, 30 38, 40, 44, 46–47, 56, 59, 63, 66, Figs. 4, 8; Ex. 1036 ¶ 134). Snap also points to cross-examination testimony by Dr. Martin allegedly admitting that the '439 patent discloses the sharing in nodes only because nodes are constituent parts of the entire context graph, which is shared between users. *Id.* at 2–3 (citing Ex. 1029, 138:5–139:4; Ex. 1036 ¶¶ 135–136); *id.* at 3 (citing Ex. 1029, 114:18–120:18); *see also* Pet. Sur-reply 2–5.

PARC replies that the '061 application discloses that (1) "[e]ach user is associated with a context graph," (2) "context graphs can also be shared between users," and (3) "context graphs with greater numbers of nodes [can be managed] using cross module interconnections." PO Reply MTA 3 (alterations in original) (quoting Ex. 1004 ¶¶ 48–49) (citing Ex. 2011 ¶¶ 51–54). Based on these disclosures, PARC contends that the '061 application discloses combining data from multiple clients for efficiency and to avoid replication, and this requires that nodes for each user be stored in the same memory location. *Id.* at 3–4 (citing Ex. 1004 ¶ 49; Ex. 2011 ¶¶ 111–112). PARC disagrees that Dr. Martin's cross-examination testimony suggests that sharing an entire content graph is the only reason that the '061 application discloses node sharing. *See id.* at 5–6 (citing Ex. 1029, 138:5–21).

We agree with Snap that PARC has not shown where, in the '061 application, there is a disclosure of nodes shared between two or more users, particularly in light of PARC's position that a "context graph" must always be "per-user." At best, PARC's arguments go to whether the sharing of

nodes would have been obvious in view of the disclosure in the '061 application. Although "the description requirement does not demand any particular form of disclosure, . . . a description that merely renders the invention obvious does not satisfy the requirement." *Ariad*, 598 F.3d at 1352 (citing *Carnegie Mellon Univ. v. Hoffmann–La Roche Inc.*, 541 F.3d 1115, 1122 (Fed. Cir. 2008); *Lockwood v. Am. Airlines*, 107 F.3d 1565, 1571–72 (Fed. Cir. 1997)).

Thus, we find that PARC has failed to show support in the original disclosure for the added phrase "wherein the context graph includes nodes shared between two or more users." Consequently, we find that each of the proposed substitute claims would introduce new matter, and the amendments are disallowed under 35 U.S.C. § 316(d)(3).[18]

C. Patentability of the Proposed Substitute Claims

Having considered whether PARC has met its statutory and regulatory burden for a motion to amend, we next consider whether the record as a whole shows that the proposed substitute claims are patentable.

"A petitioner bears the burden of persuasion to show, by a preponderance of the evidence, that any proposed substitute claims are unpatentable." 37 C.F.R. § 42.121(d)(2); *see also Bosch Automotive Service*

[18] Snap also contends that PARC has failed to show written description support for "aggregating the event data from multiple mobile device clients" in proposed substitute claims 21, 27, and 33, and the "recommender's publish/subscribe system" recited in proposed substitute claim 39, which also appears in original claim 19. Pet. Opp. MTA 3–5. Because of our findings above, which affect all proposed substitute claims including claim 39, we need not address these separate questions.

Solutions, LLC v. Matal, 878 F.3d 1027, 1040 (Fed. Cir. 2017), *amended by Bosch Automotive Service Solutions, LLC v. Iancu*, No. 2015-1928 (Fed. Cir. Mar. 15, 2018). To determine whether a petitioner has proven the substitute claims are unpatentable, the Board focuses on "arguments and theories raised by the petitioner in its petition or opposition to the motion to amend." *Nike, Inc. v. Adidas AG*, 955 F.3d 45, 51 (Fed. Cir. 2020). The Board itself also may justify any finding of unpatentability by referring to evidence of record in the proceeding. *Lectrosonics*, Paper 15 at 4 (citing *Aqua Products v. Matal*, 872 F.3d 1290, 1311 (Fed. Cir. 2017) (O'Malley, J.)).

Snap contends that each of the proposed substitute claims is unpatentable under 35 U.S.C. §§ 103 and 112. Pet. Opp. MTA 3–25. The table below is a summary of the unpatentability grounds Snap advances in its Opposition to the Contingent Motion to Amend:

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
21–40	112(a)	Written Description
21–40	112(b)	Indefiniteness
21–24, 27–30, 33–36	103	Nitz, Nykänen, Lee[19]
26, 32, 38	103	Nitz, Nykänen, Mishra, Lee
25, 31, 37	103	Nitz, Nykänen, Chang, Lee
39	103	Nitz, Nykänen, Mccolgan, Lee
40	103	Nitz, Nykänen, Sathish, Lee
21–24, 27–30, 33–36	103	Nitz, Nykänen, Lee, Chin[20]
26, 32, 38	103	Nitz, Nykänen, Mishra, Lee, Chin
25, 31, 37	103	Nitz, Nykänen, Chang, Lee, Chin
39	103	Nitz, Nykänen, Mccolgan, Lee, Chin

[19] Lee et al., US 2013/0191416 A1 (published July 25, 2013) (Ex. 1035).

[20] Chin et al., WO 2012/129771 A1 (published Oct. 4, 2012) (Ex. 1038).

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
40	103	Nitz, Nykänen, Sathish, Lee, Chin

We note that Snap's arguments under § 112(a) overlap with the discussion above about whether PARC's proposed amendment complies with 35 U.S.C. § 316(d)(3), and we do not further address this ground. *See supra* Section V.B.3.

Of the above grounds, we only address the final five grounds under § 103 involving both Lee and Chin, which are sufficient to show unpatentability of all the proposed substitute claims.[21] We also incorporate our discussion above as to the unaltered limitations in the original claims. *See supra* Section IV.

1. Obviousness of Proposed Substitute Claims 21, 27, and 33 over Nykänen, Lee, and Chin

In addition to its prior arguments regarding original claims 1, 7, and 13, Snap contends that corresponding proposed substitute claims 21, 27, and 33 are unpatentable under § 103 as obvious over Nitz, Nykänen, Lee, and Chin. Pet. Opp. MTA 7–22. We address Snap's arguments below.

[21] Snap states that, "[t]he Petition's analysis and Dr. Turnbull's prior opinions . . . remain applicable to the independent claim's unamended limitations, . . . and a [person of ordinary skill in the art] would have been motivated and found it obvious to incorporate Li's . . . teachings in the Petition's grounds." Pet. Opp. MTA 13. We incorporate our analysis above with respect to these limitations. *See supra* Section IV.

(a) Overview of Lee

Lee describes a method for analyzing an unstructured text query from a user based on a social graph. Ex. 1035, code (57). Figure 3, an example social graph, is reproduced below:

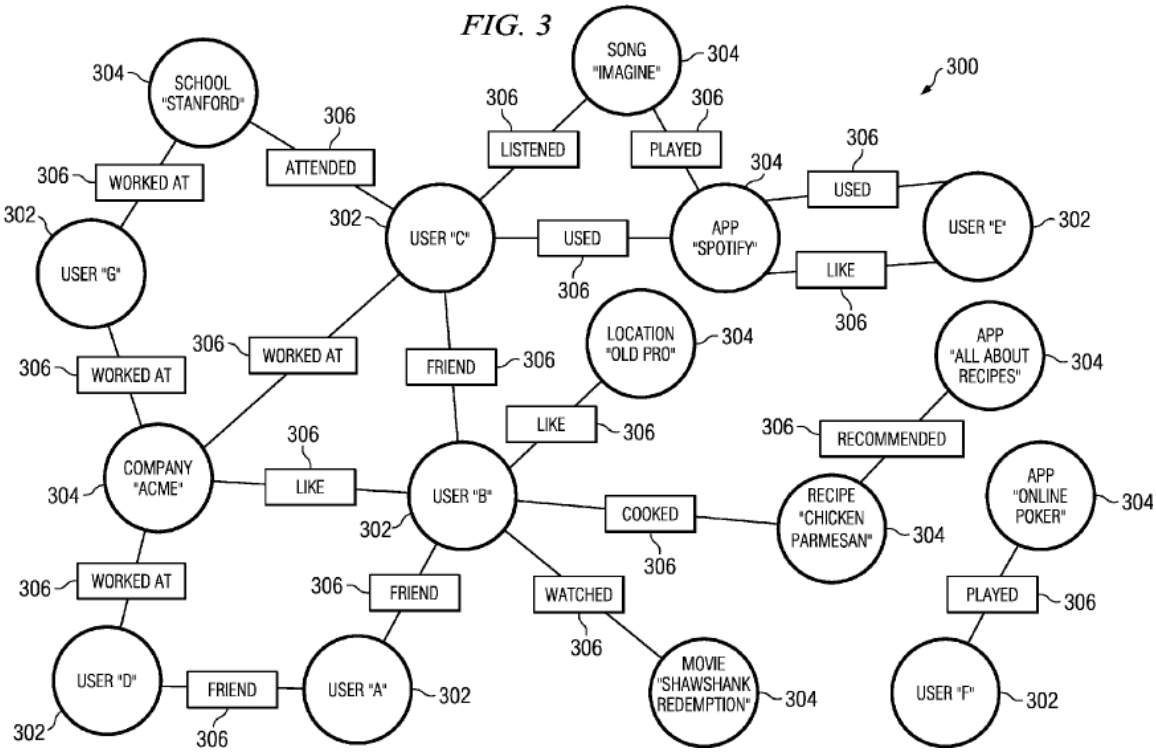

Figure 3, above, depicts social graph 300 stored by a social-networking system in one or more data stored. Ex. 1035 ¶ 33. It comprises a plurality of user nodes 302, concept nodes 304, and edges 306. *Id.* For example, in this diagram, "USER 'G'" 302 and "USER 'C'" 302 both have "WORKED AT" edges 306 connecting with concept "COMPANY 'ACME'" 306.

(b) Overview of Chin

Chin describes "[a]n approach . . . for creating a connection between users of a social network" which "involves determining location information associated with a user and other location information associated with one or

more other users." Ex. 1038, code (57). The approach also includes generating recommendations based, at least in part, on encounters between the users. *Id.*

(c) Amendments Regarding "Server-Side Architecture"

Proposed substitute claims 21, 27, and 33 require that the "aggregating," "determining," and "sending" steps occur at or by "the server-side architecture." MTA App'x 1, 3–4, 6.

PARC argues that "Nitz teaches a single-user environment rather than a multi-user environment," and does not disclose aggregating multiple mobile device clients "to be analyzed at the server-side architecture for co-location events." MTA 11–12. Also, PARC argues that "the combination of Nitz and Nykänen does not teach or render obvious the claimed server-side architecture in the proposed claims." MTA 16 (emphasis omitted).

Snap contends that "*Nitz* discloses a server-side architecture" at device 754 (Fig. 7) because "*Nitz* explains device 754 (remote from mobile device 710) may be any type of computing device such as a server or a combination of computers or devices." Pet. Opp. MTA 8 (emphasis omitted) (citing Ex. 1005, 29:7–13; Ex. 1036 ¶¶ 151–155). Snap also argues that "Nitz discloses and/or suggests aggregating event data from mobile device clients for analysis at device 754" because "*Nitz* explains that 'other mobile devices' may be a 'source of real-time inputs 116.'" *Id.* at 9 (citing Ex. 1005, 10:30–47).

Snap further contends that a person of ordinary skill in the art would have understood that Nitz discloses "aggregating event data from multiple mobile devices (which are 'clients' to remote server 754) regarding co-

location events (e.g., 'friends' carrying mobile devices in 'close physical proximity to one another' and data about 'something important about [a] person's current context' while at the same location)." Pet. Opp. MTA9 (citing Ex. 1005 at 10:34–44). Snap also argues that device 754 contains an inference engine 728, mobile advisor 730, knowledge base 732, and inputs and information 734 that operate in same way as the respective components discussed for Figure 1, and can also include both a local portion and remote portions. *Id*. at 8 (citing Ex. 1005, 29:35–43, Fig. 7).

Snap also argues that a person of ordinary skill in the art "would have been further motivated . . . to configure *Nitz*'s system/processes to aggregate event data from multiple mobile devices at device 754 (server-side architecture) for analysis regarding 'co-location' events in light of the teachings/suggestions provided by *Chin*." Pet. Opp. MTA24. As to the "determining" and "sending" steps, Snap argues for the same and other reasons that these would also be performed on the server side. *See id.* at 19–22.

PARC responds that Nitz "describes peer-to-peer communication where any 'analysis' is done at the mobile device, not one that is performed at/by server-side architecture." PO Reply MTA8 (citing Ex. 1005, 10:30–44; Ex. 2011 ¶ 104). According to PARC, Nitz does not explain how event data from multiple mobile devices would be sent to a server for analysis. *Id.* Moreover, PARC contends that there would be no motivation to do this because sending this data to a server would increase the data's staleness by injecting delays and slowing down the transmission. *Id.* at 8–9 (citing Ex. 2011 ¶¶ 105–106). PARC also contends that Nitz does not disclose what the

"something important" is about a person's current context that would lead to a co-location event. *Id.* at 9–10 (citing Ex. 2011 ¶ 107).

Snap counters that PARC "completely ignores the alternate prior art combinations involving Chin . . . , and thus does not (and cannot) dispute that the Nitz-Chin combinations meet and render obvious the claimed 'aggregating'/'co-location event' features."[22] Pet. Sur-reply 8 (citing Ex. 1038). Also, apart from its arguments focusing primarily on the "aggregating" step, PARC does not specifically contest PARC's argument that Nitz discloses that the "determining" and "sending" steps are performed on or by the server-side architecture. *See generally* PO Reply MTA.

We find Snap's arguments persuasive based on the combination of Nitz and Chin. In particular, to the extent that PARC's arguments directed to Nitz alone have merit, Chin would remedy any deficiency because it clearly teaches aggregation of event data from multiple devices regarding co-location events by users of a social network. Ex. 1038, code (57). We find persuasive Snap's argument that a person of ordinary skill in the art would have specifically applied Chin's teachings to the operation of Nitz's server-side device 754. *See* Pet. Sur-reply MTA24.

We also find persuasive Snap's argument that, taken as a whole, Nitz's disclosure relates not just to pushing event data to another user device, but to aggregating data from multiple devices at a server, because Nitz discloses that "information can be used by the system 100 as additional

[22] Snap alternatively argues that Nitz discloses pushing event data not just to another user device, but to a server. Pet. Sur-reply MTA6–9. Because we find Snap's arguments in light of Chen persuasive, we do not need to address these arguments based on Nitz alone.

real-time inputs 116, to influence (and presumably improve) the inference engine 110's assessment of the current situation and context," where a person of ordinary skill in the art would have understood that engine 110 would be located at server-side remote device 754. Pet. Sur-reply MTA6 (quoting Ex. 1005, 10:44–47); *see* Ex. 1005, 29:8–13 (device 754 "may be embodied as any suitable type of computing device such as, for example, a server").

Thus, we agree that Nitz, in view of Chin, discloses performing the recited "aggregating" step, specifically on the server side. For the same reasons, we also agree that the "determining" and "sending" steps would take place on the server side, as recited in the proposed amended claims.

(d) Amendments Regarding Sharing Nodes Between Two or More Users

Proposed amended claims 21, 27, and 33 include the new limitation "wherein the context graph includes nodes shared between two or more users." MTA App'x A, 1, 3, 6. PARC contends that none of the references relied upon in combination in the Petition disclose a context graph that includes nodes shared between two or more users. MTA13–15.

Snap argues that "[i]t would have been obvious in light of *Nitz's* disclosures and a [person of ordinary skill in the art]'s knowledge to arrange the models and related contextual information using known graph-based structures and configurations (e.g., logical representations including edges, nodes, etc.)," and that though "*Nitz* may not expressly disclose that the models and related contextual information are configured as a context graph including nodes shared between two or more users," it would have been obvious "to implement such features in light of *Lee* and a [person of

ordinary skill in the art]'s state of art knowledge." Pet. Opp. 13–14. Snap thus contends that Lee discloses the new recited limitation in combination with Nitz and Nykänen. *Id.* at 14–19.

Snap also argues that "Lee describes that the disclosed system can use multiple social networking systems 20, each including multiple social graphs 300 having edges and nodes (corresponding to users, user profile data, concept nodes, etc.)." Pet. Opp. MTA 16. According to Snap, these "can be dynamically updated as users interact with the system," and "users (that can be associated with different social graphs) can access the profile of another user (which can be a node in a different social graph)." *Id.* Petitioner further contends "*Lee* describes features where sub-graphs can be created that may comprise user nodes and selected edge connections between nodes." *Id.* (citing Ex. 1035 ¶ 131).

PARC counters that Snap has only attempted to show that users send data to other users, whereas "sharing nodes" means the sharing of data storage for increased efficiency. PO Reply MTA 10 (citing Ex. 2011 ¶¶ 51–58, 111–112). PARC contends that "Lee does not disclose this concept of sharing nodes." *Id.* at 11 (citing Ex. 2011 ¶¶ 113–117). PARC also argues that Lee's alleged "context graph" is not "per-user" because it is "multi-user." *Id.* at 12 (citing Ex. 2011 ¶ 117).

Snap responds that, assuming PARC is correct that the sharing of nodes means the sharing of data, Snap has shown that Nitz discloses this. Pet. Sur-reply 10 (citing Pet. Reply 10–11, Pet. Opp. MTA 16–19; Ex. 1005, 25:48–52). Snap also argues that Dr. Martin "acknowledged that there were multiple ways to accomplish the claimed node sharing features, such as through pointers." *Id.* (citing Ex. 1029, 116:21–117:22). Snap argues that its

propose combination does not bodily incorporate Lee into Nitz, but still, "*Lee*'s social graphs (including sub-graphs with nodes/edges) are stored as data structures maintained by a social network system in systems/databases/data stores in a manner consistent with ways the context graph of the '439 patent can be configured." *Id.* at 11 (citing Ex. 1001, 7:34–40; Ex. 1035 ¶¶ 20–21, 27–30, 33–34, Figs. 2B, 3; Ex. 1029, 31:14–34:12). And, according to Snap, "*Lee* discloses a per-user context graph." *Id.*

As we discuss above, we determine that Nitz (particularly in view of its incorporated references) already teaches a per-user context graph. *See supra* Section IV.C.4. We also find Snap's argument persuasive that Lee's disclosure of sharing via the use of pointers is sufficient to teach "nodes shared between two or more users." *See* Pet. Opp. MTA 15 & n.6; Ex. 1029, 116:6–117:22 (Dr. Martin testifying that the way sharing is done is "an implementation decision" and "[o]ne way that it could be done is through a pointer to the memory underlying the shared nodes."); Ex. 1035 ¶ 30 ("[T]he nodes or edges themselves are data objects that include the . . . information . . . for their corresponding users or concepts, some of which is actually rendered on corresponding profile or other pages. The nodes may also include pointers or references to other objects . . . .").

Thus, we determine that Snap has persuasively shown that Nitz, in view of Lee, teaches the limitation "wherein the context graph includes nodes shared between two or more users" as recited in the proposed amended claims.

(e) Conclusion as to Proposed Substitute Claims 21, 27, and 33

For all reasons discussed in the sections above, we determine that Snap has shown by a preponderance of the evidence that proposed substitute claims 21, 27, and 33 are unpatentable as obvious over Nitz in view of Nykänen, Lee, and Chin.

2. Obviousness of Proposed Substitute Claims 22–26, 28–32, and 34–40

For claims 22–26, 28–32, and 34–40, Snap relies on its arguments in Grounds 1–5 of the Petition. *See* Pet. Opp. MTA22–25. Snap argues that the addition of Lee and Chin to these grounds would not have deterred a person of ordinary skill in the art from implementing the limitations of the proposed substitute claims. *Id.* at 23–24. PARC does not dispute this, and we find it persuasive. *See generally* PO Reply MTA.

Thus, for all the above reasons, we conclude that Snap shows, by a preponderance of the evidence, that proposed substitute claims are unpatentable under § 103 as obvious over Nitz in view of Nykänen, Lee, and Chin (claims 21–24, 27–30, and 33–36); over Nitz, in view of Nykänen, Mishra, Lee, and Chin (26, 32, and 38); over Nitz in view of Nykänen, Chang, Lee, and Chin (claims 25, 31, and 37); over Nitz in view of Nykänen, Mccolgan, Lee, and Chin (claim 39); and over Nitz in view of Nykänen, Sathish, Lee, and Chin (claim 40).

VI. CONCLUSION[23]

For the reasons above, Snap has shown by a preponderance of the evidence that claims 1–20 of the '439 patent are unpatentable under § 103 as obvious over Nitz in view of Nykänen (claims 1–4, 7–10, and 13–16); over Nitz, in view of Nykänen and Mishra (6, 12, and 18); over Nitz in view of Nykänen and Chang (claims 5, 11, and 17); over Nitz in view of Nykänen and Mccolgan (claim 19); and over Nitz in view of Nykänen and Sathish (claim 20).

Also, because PARC has failed to show, by a preponderance of the evidence, that proposed substitute claims 21–40 do not contain new matter, and because Snap has shown, by a preponderance of the evidence, that the claims are unpatentable under § 103, we deny PARC's Contingent Motion to Amend.

VII. ORDER

In consideration of the foregoing, it is

ORDERED that claims 1–20 of the '439 patent are unpatentable;

FURTHER ORDERED that PARC's Contingent Motion to Amend is *denied*;

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[23] Should PARC wish to pursue amendment of claims in a reissue or reexamination proceeding after this decision, we draw PARC's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. *See* 84 Fed. Reg. 16,654 (Apr. 22, 2019). If PARC chooses to file a reissue application or a request for reexamination of the challenged patent, we remind PARC of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. § 42.8(a)(3), (b)(2).

FURTHER ORDERED that PARC's Motion to Exclude (Paper 36) is *denied*; and

FURTHER ORDERED that parties to this proceeding seeking judicial review of our decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

In summary:

Claim(s)	35 U.S.C. §	Reference(s)/ Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1–4, 7–10, 13–16	103	Nitz, Nykänen	1–4, 7–10, 13–16	
6, 12, 18	103	Nitz, Nykänen, Mishra	6, 12, 18	
5, 11, 17	103	Nitz, Nykänen, Chang	5, 11, 17	
19	103	Nitz, Nykänen, Mccolgan	19	
20	103	Nitz, Nykänen, Sathish	20	
Overall Outcome			1–20	

The table below summarizes our conclusions as to PARC's Contingent Motion to Amend the claims:[24]

Motion to Amend Outcome	Claim(s)
Original Claims Cancelled by Amendment	
Substitute Claims Proposed in the Amendment	21–40
Substitute Claims: Motion to Amend Granted	
Substitute Claims: Motion to Amend Denied	21–40
Substitute Claims: Not Reached	

[24] Should PARC wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this

decision, we draw PARC's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding. See* 84 Fed. Reg. 16,654 (Apr. 22, 2019). If PARC chooses to file a reissue application or a request for reexamination of the challenged patent, we remind PARC of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. § 42.8(a)(3), (b)(2).

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